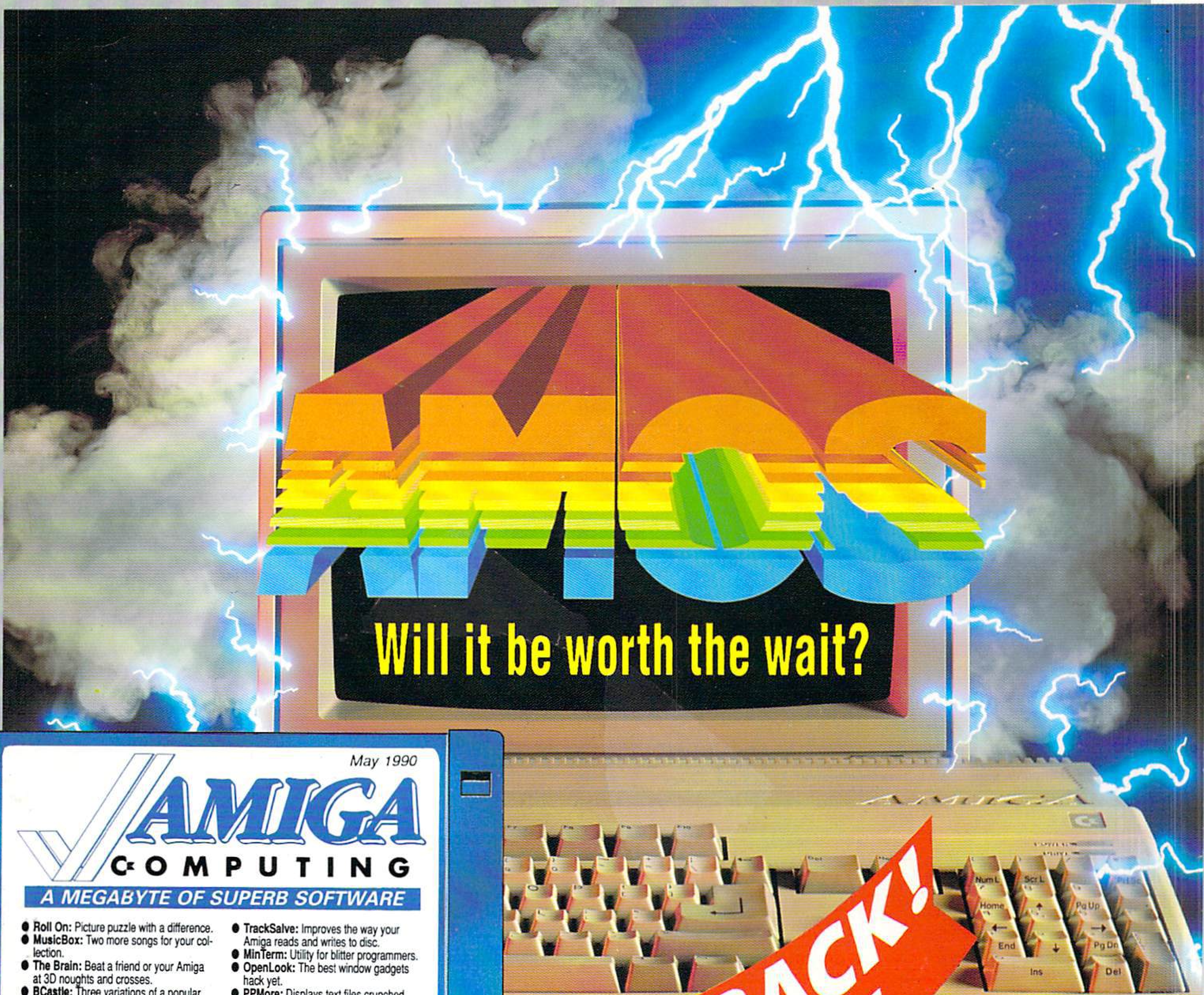
Volume 2
Number 12
May 1990
£2.95

An Interactive Publication

AMIGA COMPUTING



May 1990

AMIGA COMPUTING

A MEGABYTE OF SUPERB SOFTWARE

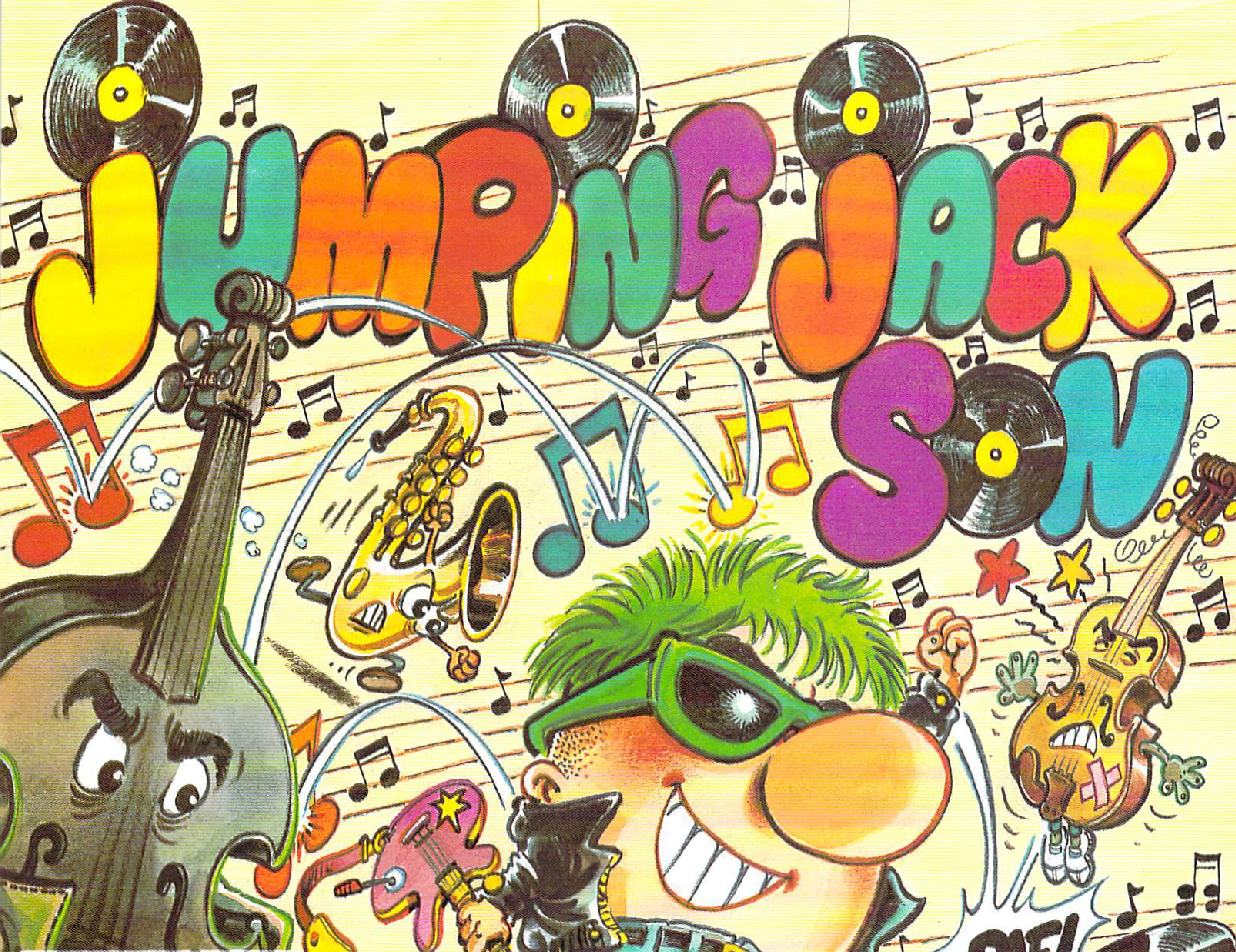
- **Roll On:** Picture puzzle with a difference.
- **MusicBox:** Two more songs for your collection.
- **The Brain:** Beat a friend or your Amiga at 3D noughts and crosses.
- **BCastle:** Three variations of a popular card game.
- **TrackSalve:** Improves the way your Amiga reads and writes to disc.
- **MinTerm:** Utility for blitter programmers.
- **OpenLook:** The best window gadgets hack yet.
- **PPMore:** Displays text files crunched with PowerPacker.

All instructions are in the May issue of **Amiga Computing**

IT'S BACK!
– See Page 57

05
9 770954 594993

WIN your own snooker table











Music to your ears Rock'n'Roll is back in town!



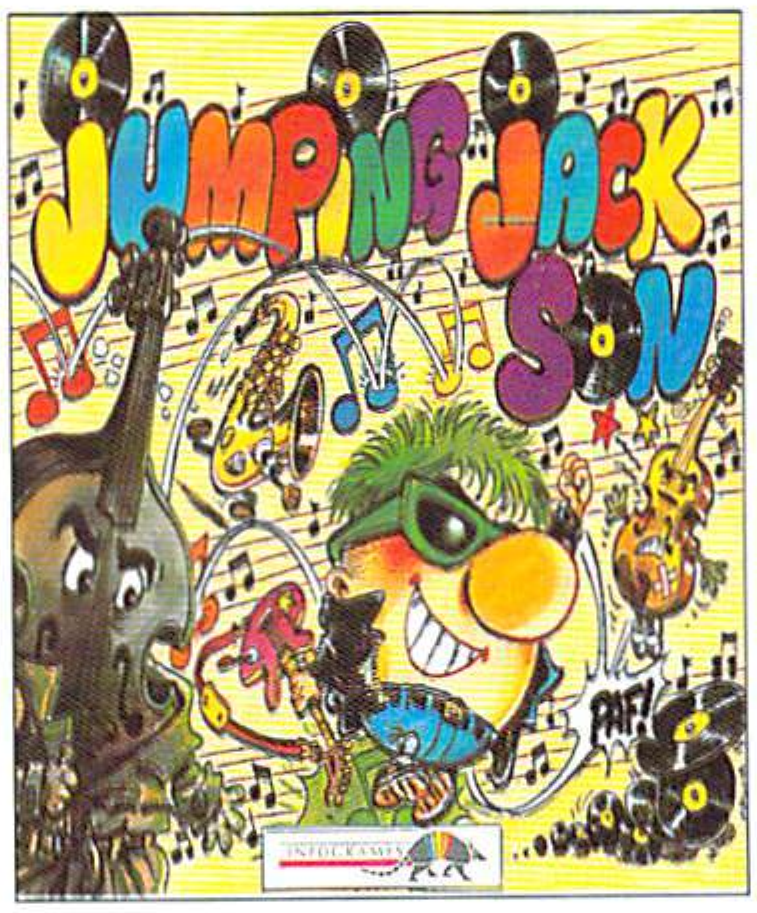
In a deluge of colour and music, save the Earth from a classical catastrophe. Classical music (yuk!) in its most tortureous form has overrun the world. With monsters so hideously hideous, so exaggeratingly evil, so barbarously bad, it's slowly destroying the last traces of the only great music... Rock'n'Roll. JUMPING JACK SON is our only hope.

As quick as a flash, find out the "timeless classic", the "golden oldie", the records which made Rock'n'Roll. And, of course, the first 45 cut by the King himself, Elvis Presley. All these records must be placed where they belong... THE JUKE BOX.

JJS is the fulfilment of technical performances. More than 27 colours on the main game screen (on both Amiga and Atari!), and up to 100 colours on the other screens. And don't turn a deaf ear! JJS also has 400 kb of Rock'n'Roll and FX sounds.

JUMPING JACK SON is a Magical, Musical, Visual, Mystery Tour... An ear splitting, eye popping adventure.
JUMP at the opportunity and JIVE into the action.

SATISFACTION GUARANTEED!



AVAILABLE ON ATARI ST, STE, AMIGA.

INFOGRAMES

Managing Editor
Derek Meakin

Features Editor
Jeff Walker

Staff Writers
Nic Veitch
John Kennedy

Production Editor
Peter Glover

Art Editor
Tym Lecky

Advertisement Manager
John Snowden

Advertising Sales
Wendy Colburn

Published by:
Interactive Publishing Ltd,
Europa House, Adlington Park,
Adlington, Macclesfield SK10 4NP.

ISSN 0952-5948

Editorial: 0625 878888
Advertising: 0625 878888
Subscriptions: 051-357 2961
Fax: 0625 879966

interactive publishing

Chairman
Derek Meakin

Managing Director
Hugh Gollner

Commercial Director
David Hirst

Amiga Computing welcomes articles for publication. Material should be typed or computer-printed, and preferably double-spaced. Program listings should be accompanied by disc. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions can only be accepted for publication by Interactive Publishing Ltd on an all-rights basis.

News trade distribution: Comag Magazine Marketing, Tavistock Road, West Drayton, Middlesex UB7 7QE. Tel: West Drayton (0895) 444055.

AMIGA SCENE

11 NEW ROUNDUP
Ami-Expo to visit London, autumn launch for CD-rom, PC emulator for the A500, *Amiga Computing* saving the environment.

LETTERS

19 EXRA'S POSTBOX
Dropping the disc causes consternation, Amiga's image as a games machine has to die, Hackers program for fun not profit.

PROGRAMMING

25 GAME TREES
Getting your Amiga to play intelligently against a human is no easy matter. AJ puts down some roots in Artificial Intelligence.

SHORTIES

29 AMIGA X CROSSDOS
DJ Walker-Morgan takes a peek at Dale Luck's X for the Amiga, Stewart C. Russell discovers that CrossDos is a must.

HOUSE CALL

33 CHECKMATE'S A1500 UPGRADE
Expansion-minded A500 owners have an alternative upgrade path. John Kennedy visits Checkmate to find out if the rumours are true.

GAMES

36 AMIGA ARCADE
The action starts here as we report on what's in the pipeline from the top software houses, plus reviews of this month's haul.

COVER STORY

64 AMOS AMOUR
Jeff Walker takes an early look at a programming language in which Basic programmers will be able to produce top quality games.

BOOK REVIEW

71 ABACUS CORKER
Paul Andreas Overaa flicks through The Advanced System Programmer's Guide for the Amiga to see if it delivers.

FEATURE

74 CHAOS - WEATHER YOU LIKE IT OR NOT
In the second of Alastair Scott's series, discover with the aid of Amiga Basic how to display a strange attractor on your screen.

GAME KILLER

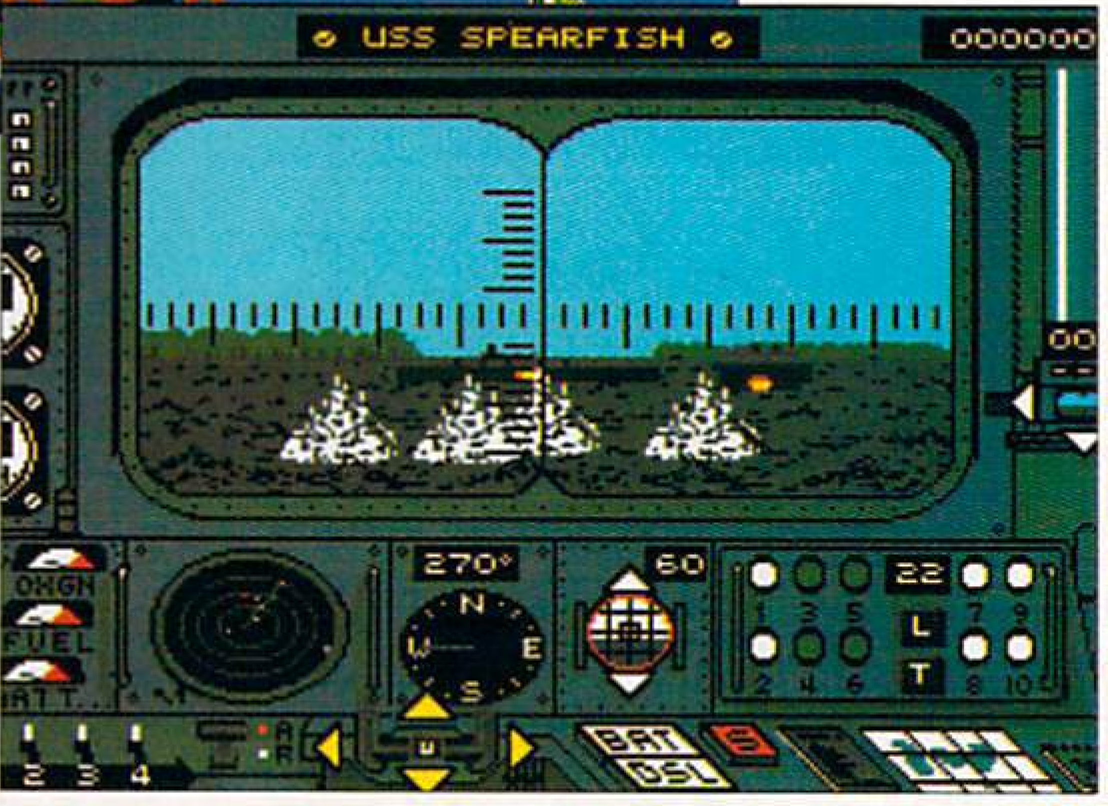
78 MAX THE HACKS
The main man is here with a new cheat mode for Faery Tale, the passwords for Magic Marble and seven other cheeky cheats.

COMPETITION

82 WIN A POT BLACK SNOOKER TABLE
Feel the pull of the green baize? Then chalk up your cue, pot all the balls in the screen shot and tell us the highest break.



Rainbow Islands – Page 54



Hunter Killer – Page 46

PROGRAMMING

85 APL.6800 REVIEW

Nic Veitch assesses Micro APL's Amiga implementation of the symbol-based programming language for mathematicians.

HARDWARE

90 XETEC 85 MEG HARD DRIVE

Fasten your safety belts as John Kennedy takes a hair-raising ride on a Xetec 85 meg hard drive with an 11 millisecond access time.

MUSIC

97 MASTER SOUND

The words cheap and good sampler usually don't go together. Stewart C. Russell finds the exception to the rule.

PORTFOLIO

102 ARTISTS' SHOWCASE

Featured this month are the impressionist mouse sweeps of a Spaniard in Stockholm – some of the best HAMs you'll ever see.

TAILPIECE

114 LAST BLIT

Does computer jargon confuse you? COOYD with OTT acronyms? Then read our essential guide to passing yourself off as a professional.

COVER DISC

57



ROLL ON
Have hours of fun with this original slider puzzle. And when you've finished it, get out your paint program and design some more screens.

TRACKSALVE
Fixes some bugs in the trackdisk device and brings a host of advanced features to the Amiga's disc operating system.

MUSICBOX
An upgrade of the popular SoundFX player program, plus two more tunes for your collection.

CHAOS
Thrill to the swish of a swinging pendulum, stare in awe at the forces behind a strange attractor.

OPENLOOK
Give your system windows some 3D gadgets with this neat little Workbench hack.

BCASTLE
Three variations of a popular card game – Streets and Alleys, Citadel and Beleagured Castle.

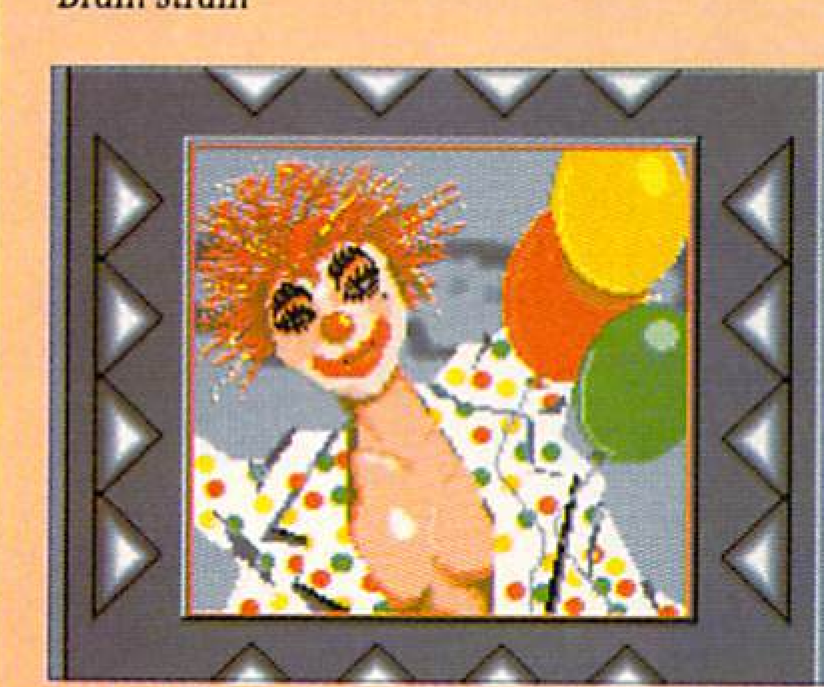
MINTERM
Blitter programmers can get their logic equations right first time with this handy Workbench utility.

PPMORE
Save space on your discs by crunching your text files with PowerPacker and displaying them with this full-featured reader.

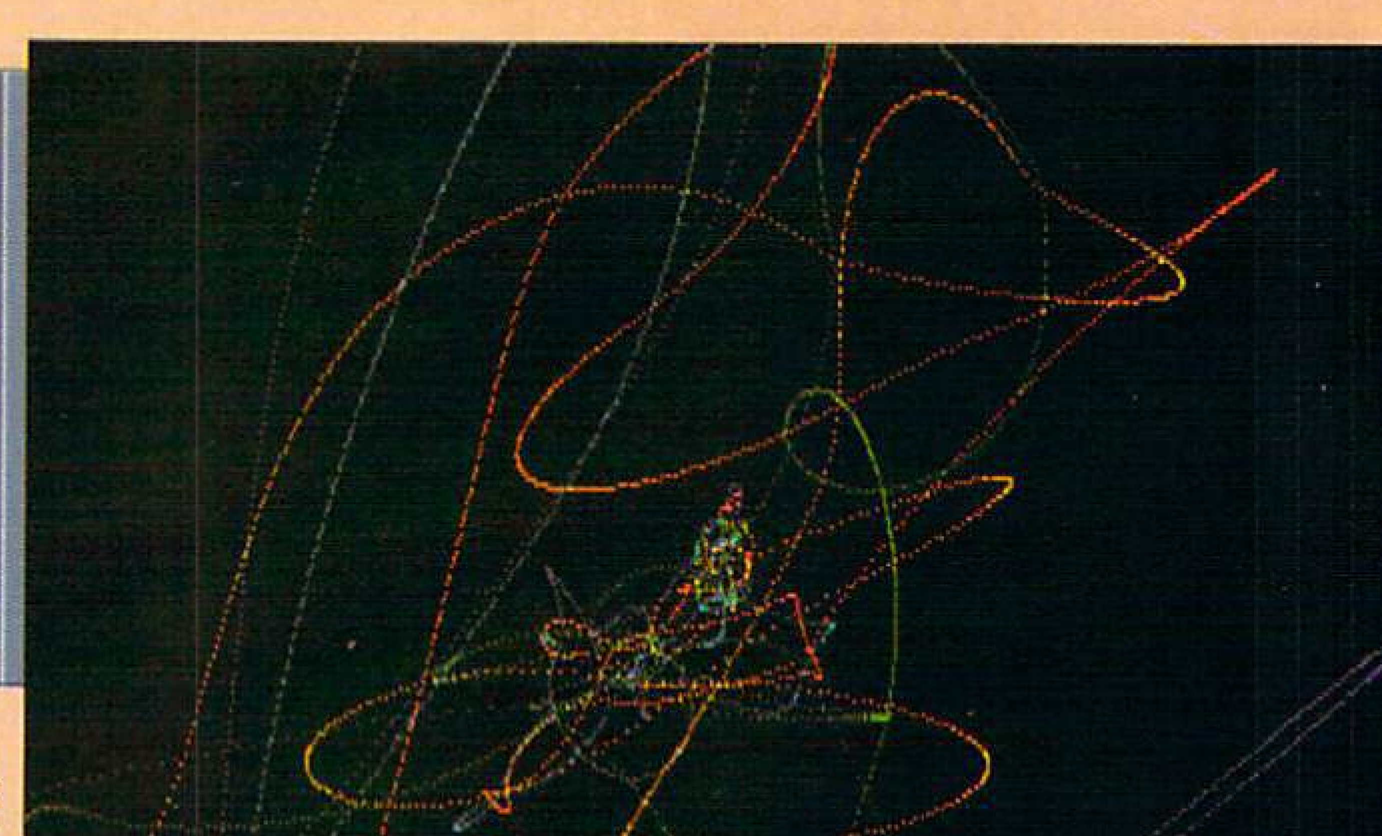
THE BRAIN
Are you intelligent enough to beat the Amiga at 3D noughts and crosses? Fast computer responses and sampled sounds.



Brain strain



Slide the squares with Roll On



The chaotic artwork of nature



Distinctly Digita

Cleverly written and always favourably reviewed in the press, Digita produces a range of powerful, low cost software for the home and business user.



DGCALC

The fastest and most powerful spreadsheet available in this price bracket, with 512 rows by 52 columns, giving you up to 26624 cells. As with all Digita products, the operation of the program is clearly thought out. Being either menu, mouse or command driven you'll be able to start using it within minutes – even if you've never used a spreadsheet before. Some of the features which make it such good value are the exporting of ASCII files for integration with other programs, adjustable column width and text overflow, programmable function keys (macros), and a unique windowing facility, so that you can look at different parts of a sheet at the same time.

£39.95

MAILSHOT

If you ever need to send out mailings or print labels, you know how fiddly and time-consuming it can be making sure all the labels are printed correctly. Well now all that's a thing of the past. Because Mailshot actually shows you the labels on screen, you can type names and addresses in exactly the correct place. But more than that, the labels are animated on screen as a continuous sheet, allowing you to scroll backwards and forwards, to search for particular keywords or to edit entries with the minimum of fuss. Facilities include searching, detection of duplicate labels, sorting (even surname!) 9 labels across, 999 copies of any label. This has to be the simplest and most effective method of creating a mailshot available.

£24.95

FINAL ACCOUNTS

The program will take information prepared by Cashbook Controller and produce a complete set of accounts including:
* Trial Balance * Trading and Profit and Loss Account
* Balance Sheet * Notes to the Accounts
* Full Accounting ratios.

All reports may be produced at any time, with comparative/budget figures if required. The facility to produce these documents quickly, accurately, and regularly is of enormous help in running any business, large or small, since one shows the true profitability achieved, and the other the exact strength of the business in terms of assets and liabilities.

£29.95

E-TYPE

Do you ever have to print names and addresses at awkward places on envelopes, or do you ever need to fill in tricky forms or invoices where the text has to be in exactly the right place? Usually you have to do it by hand, or get your trusty old typewriter out of the cupboard and dust it off. Well not anymore. The Emulated TYPEwriter transforms your computer and printer into a fully fledged typewriter, supporting bold, underline, italic and other type-styles. Because it can display and print text INSTANTLY you can line up your form, press Return and Space a few times to move to the correct place, and then start typing. Alternatively you can switch to line-by-line mode, which offers word-wrap, justification and proportional spacing, so that you can edit each line before it's printed.

£39.95

MAILSHOT PLUS

Advanced version of Mailshot for the business user with the following extra facilities:
* integration with other software (using ASCII files)
* column/tabulated summary (ideal for telephone lists, etc)
* 4 extra memo lines per label (with defaults) * system for coding, dating and adding messages to each label
* different layouts available for horizontal and vertical justification.

£49.95

CLASSIC INVADERS

Escape from executive stress with the classic space invader game.

£14.95

CASHBOOK COMBO

Money saving combination pack featuring both Cashbook Controller and Final Accounts – Save £10.00.

£69.96

PERSONAL TAX PLANNER

Are you absolutely sure your taxman is doing his job correctly? Plan your own tax with ease, this menu-driven program will calculate your income tax liability (4 tax years included) and provide pertinent facts about your tax position. You can perform 'what-if?' calculation to discover ways to minimise your tax liability. In fact, the program will advise you on things such as, if you are a married man, whether it would be advantageous to have your wife's income taxed separately or not. At this price who knows, you will probably find that PTP will pay for itself in tax savings the first time you use it!

" STOP PRESS "
July '89 – PTP user receives tax refund of over £2,000!!

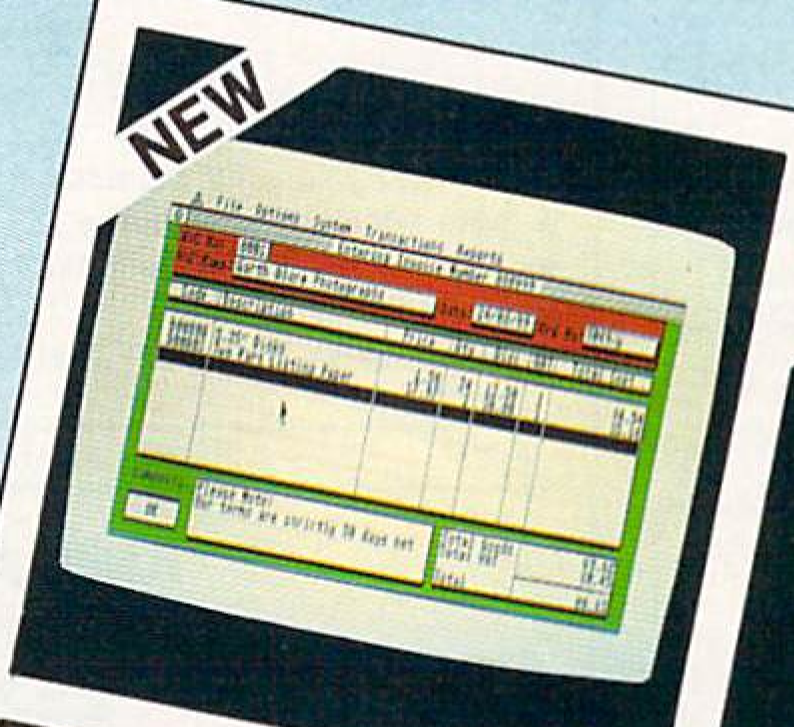
£39.95

DAY-BY-DAY

An excellent way to get organised. With it you'll be reminded of birthdays and other anniversaries, meetings and appointments, phone calls to make and so on. As with all Digita products, inputting information is simplicity itself and, once entered, you can search for keywords or for particular events such as birthdays to see when one is coming up. Includes month/week/day planner, automatic reminders for overdue appointments, month and week summary at a glance. For less than £30 this is the ideal way to make sure you never miss that important occasion again!

£29.95

NEW



SYSTEM 3

Take the first essential step in computerising your business with this simple integrated suite of programs.
1. CASHFLOW CONTROLLER: Keep track of the most important aspect of business – cash flow. Essentially a debit/credit ledger, its flexibility lies in its ability to produce account balances instantly for debtors (from invoicing), creditors, VAT, Bank, Petty Cash, together with a record of all transactions, dates and descriptions. A management aid designed to run alongside your existing accounting system.
2. INVOICE & STATEMENTS: This program will greatly reduce time and cost of preparing invoices and statements. Professionally printed invoices and a full record of debtors. Integrates with Stock Control.
3. STOCK CONTROL: Effectively control your stock, purchasing and suppliers and produce re-order reports, stock valuation, price lists, etc.

£49.95

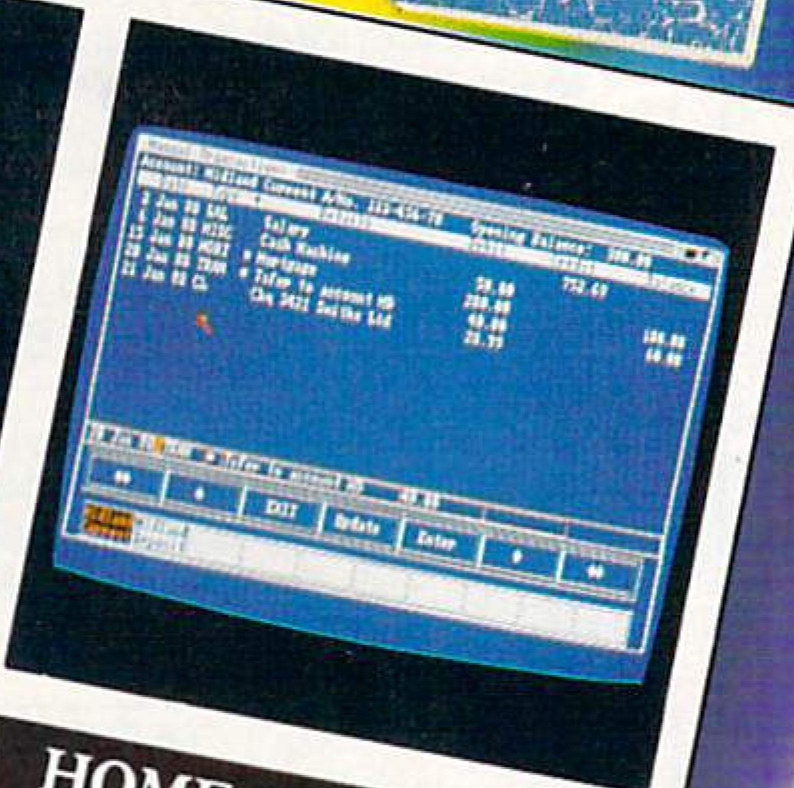
NEW



CASHBOOK

Use your computer as a powerful business tool and take the drudgery out of book keeping! In its simplest form, the program will replace your Cash and Petty Cash books BUT Digita's program, in effect, does much more. Typical information includes: * Summary of VAT information to enable completion of VAT Return. * Monthly summaries and departmental analyses of sales and purchases. * Total debtors and creditors, sales, and overheads. * Income and expenditure analysis. * Journal routine for entering transfers between accounts. * 199 nominal account titles, most of which are user definable. * Observes accounting procedures and meets legal requirements, assuring correct approach to book keeping. * Full audit trail and integrates with Final Accounts.

£49.95



HOME ACCOUNTS

Ideal for both home users and small business. Simple to use, this package will keep track of all your finances and cater for 10 types of income (e.g. Bank, credit card) and 60 types of expenditure (e.g. rates, mortgage, gas, food), with optional budgeting and forecasting. The program will handle Standing Orders and Direct Debits, and automatically warn if for example, Bank charges are likely, or if you have exceeded your credit limit. With the comprehensive reporting and graphics facilities you can even produce your own monthly Bank/Credit card statements! Once you've used Home Accounts, you'll wonder how you ever managed without it.

£29.95

Available to the trade from:
Digita, GEM, Greyhound, HB Marketing, Lazer, Leisuresoft, R & R, SDL.

DIGITA INTERNATIONAL

"Serious software at a sensible price"

• HOW TO ORDER •

CREDIT CARD HOTLINE

0395 270273

Post: Digita International Ltd
Black Horse House
Exmouth Devon
EX8 1JL England
Fax: 0395 268893

All software written in the UK. Prices include VAT & P & P (add £2.00 for export)

Ami-Expo comes to London

AMIGA owners will have a rare treat in store early next year when Ami-Expo, the giant American exhibition aimed purely at the Amiga market, will be recreated in London.

Contrary to reports in other sectors of the computer press, Ami-Expo is not coming to London in September this year. As *Amiga Computing* went to press a spokesman in America scotched rumours of a 1990 event and unveiled the true plans of organisers Ami-Show.

From his offices in Denver, Colorado, Ami-Show spokesman Erich Stein revealed exclusively that the exhibition will be held at Olympia from February 7 to 12 next year.

"A firm decision to bring Ami-Expo to London has just been made", he said. "It will be called Amiga '91 and will follow roughly the same pattern as the highly successful shows which have been staged here in America.

"Ami-Expos attract premier exhibitors on the Amiga front and through Amiga '91, we aim to provide users in the UK with a top industry event which will be a must for anyone wanting to see the lastest developments in the Amiga world".

For users who are willing to travel, it has also been revealed that Ami-Show is continuing its drive into the European market with two other events on this side of the Atlantic. Both under the Ami-Expo banner, these will be in Basle, Switzerland from May 10 to 13 and at the Cologne Convention Centre, West Germany from November 8 to 12.

In America, Ami-Expos are planned at the Hyatt Regency, Chicago from June 29 to Jul 1 and at the Disneyland Hotel, Anaheim, California from October 5 to 7 following the latest event which was held at the Sheraton, Washington DC from March 16 to 18.

Double Dutch

DUTCH company US Action has now set up a UK subsidiary which has launched two new products for the Amiga.

Deluxe Paint Tutorial is a software-based instruction course which aims to help Amiga users get the best out of animation and paint packages for their machines. Released in English, German, French and Dutch, it costs £29.95.

Also newly launched by US Action (01-977 8225) is its Light Phaser Action pack which includes a light gun and two games for £49.95.

In addition to software products, US Action sells a range of disc drives, hard discs, ram cards, sound digitisers, midi interfaces and add-on cards for the Amiga.

16 bit showcase

FOLLOWING the launch of the 16 Bit Computer Fair in January, plans are under way for a summer event to be held at The Royal Horticultural Halls, London from June 28 to July 1.

Organisers Westminster Exhibitions reported strong interest and claimed that only 10 stands were unfilled.

Similar to the January show, it will be a mixture of retailers, publishers and manufacturers supplying the Amiga and Atari ST markets.

Ion out a problem

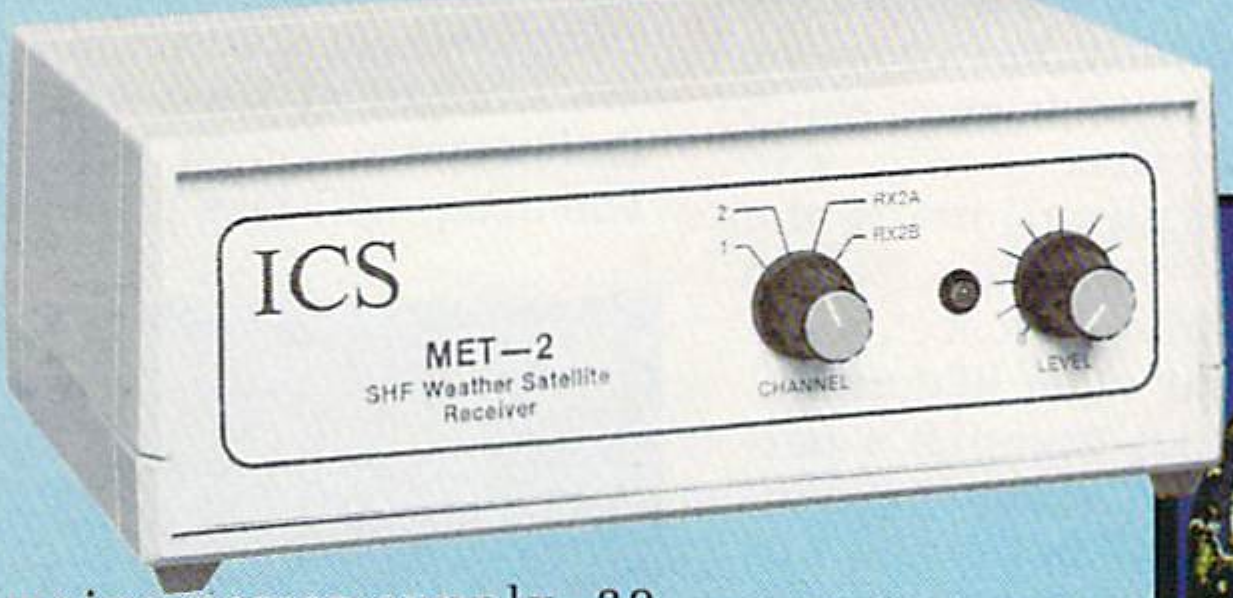
DIZZINESS, headaches and eyestrain are ailments which could befall Amiga buffs who spend too long staring at their screens.

Recently formed company Joy of Life Arts (0695 32382) claims to have the remedy with its Mountain Breeze computer ioniser.

To counteract the static generated by the screen and eliminate unwated dirt, smoke or bacteria attracted by it, the device sits on top of the monitor and gives out "an enlivening stream of negative ions" to restore the ion balance.

It needs a mains supply of 220/240 volts with power consumption of two watts. With a two-year guarantee, the unit costs £29.95.

Meteosat connection

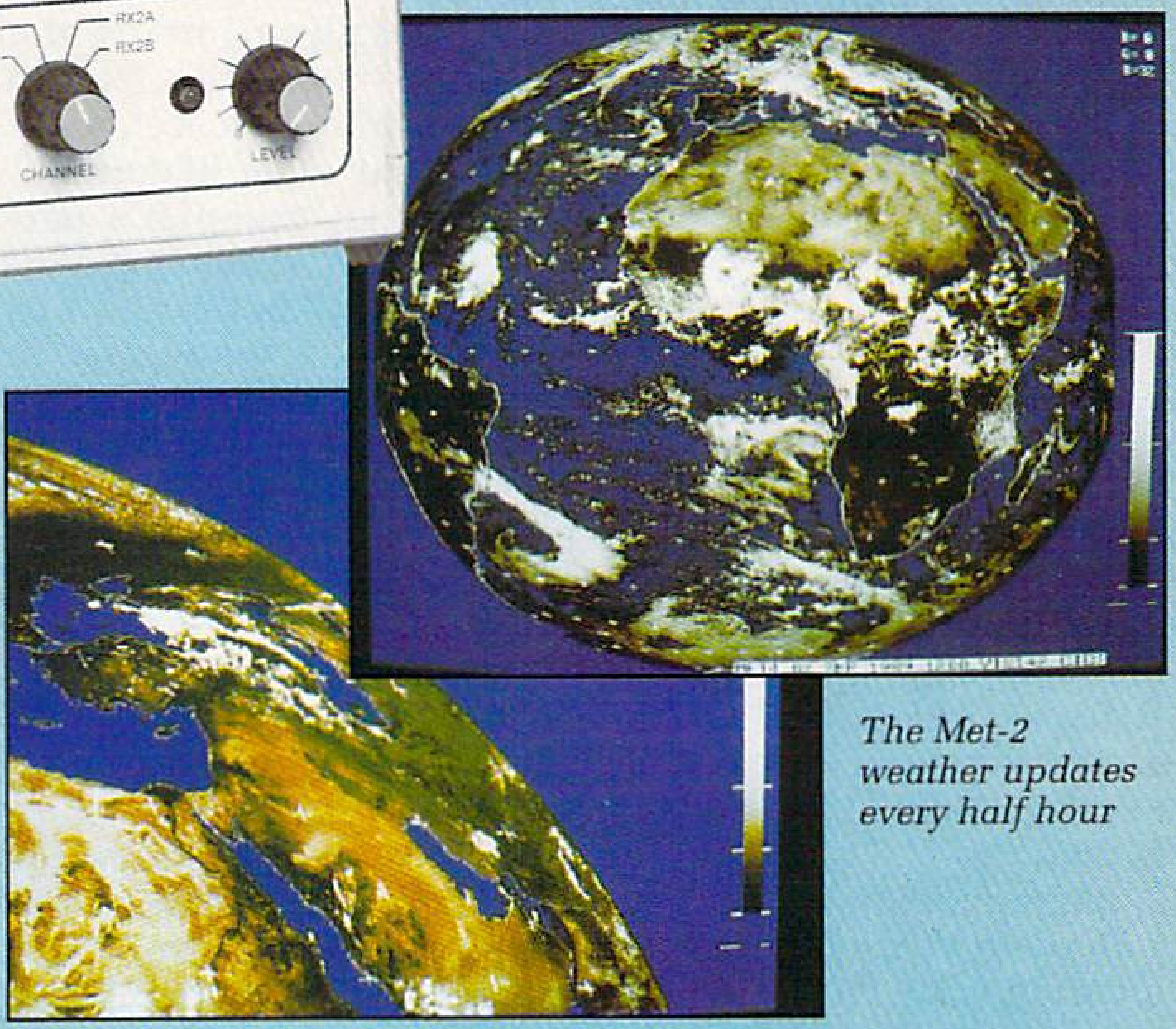


AMIGA owners who want to use their machines as home weather stations are now being offered a new system which developer ICS Electronics (0903 731101) claims is a price breakthrough.

Weighing in at £689.95, it can receive weather pictures directly from the European Meteosat 4 satellite situated over the equator and the Greenwich Meridian.

Full-colour detailed cloud cover of Europe is updated in high resolution every half hour by the MET-2 system which includes a receiver and pre-amplifier, a three metre long Yagi antenna, a mains power supply, 20 metres of antenna cable and software for the Amiga - everything needed for weather satellite reception except the computer.

"The MET-2 is an order of magnitude cheaper than some similar systems already on the market", said Alan Clemetson for ICS. "In the UK, a site for the antenna is required with a clear view to the south at an elevation of approximately 30 degrees".



The Met-2 weather updates every half hour

Autumn launch for CD-rom

COMMODORE'S rumoured CD-rom games machine based on the Amiga will be launched in August or September this year, it has been revealed to *Amiga Computing*.

According to the trade sources a prototype of the games console fitted with a CD-rom unit was previewed to an elite few at the recent Consumer Electronics Show in Las Vegas. A spokesman said: "We believe it will be the end of the summer or start of autumn before it comes out. No information is available at present but we expect it to be launched in August or September".

Non-disclosure agreements have had to be signed by anyone viewing the prototype, and the official line is that price and full specifications have not yet been finalised. It is understood, however, that a number of leading software publishers have been approached by Commodore with a view to developing games on compact disc.

Because of the cost involved in this new technology, it is expected that the machine could weigh in at a hefty £500, and the first public showing could be at the June CES in Chicago.

Meanwhile, French company Titus has produced its first compact disc-based game.

Called Titan, it has been developed on a Mac II with the CD Amiga console in mind using Sony's CD-I (compact disc interactive) technology which provides greatly increased memory potential for developers plus excellent graphics, sound effects and music for players.

Auto-boot on tap

NEW enhancements for the original Commodore Amiga hard disc controller have been announced by Amiga Centre Scotland (031-557 4242).

The Combitec turbo autoboot card is an add-on for the A2090 controller which will not normaly autoboot and the Turbo Chip Set for the A2090 A.

Both are designed to eliminate problems associated with the original controller software. They offer Amiga 2000 owners with old hard-drive controllers full autoboot directly from FastFile System, double the speed with ST 506 drives, automatic SCSI drive ID and easy installation.

New mouse-driven software comes with both card and chip set. Price of the card is £59. At time of going to press, no price had been fixed for the chip set.

3D game goes online

HERALDING the birth of a whole new concept for multi-user games, Bloodstone is now up and running exclusively on electronic communications service MicroLink (0527 67585).

Already drawing a large following, it has notched up a number of firsts in the world of multi role-play adventures.

Bloodstone is the first 24 hour, none re-set game of its kind and the first to offer total freedom of movement in three dimensions.

Up to 256 players can take part combining loving, killing, buying and selling in an environment which can be constantly changed.

Realistic combat routines rise above the fighting in other games not relying solely on strength. Dexterity, help from other characters, weapon and armour strength are taken into account to give battle a whole new dimension.

Other new features include buying and selling, a peer facility allowing players to see great distances, a think command so players can communicate telepathically, use of spells, the ability to teleport yourself to other levels, and polymorph, allowing the player to change from a human into an insect, monster or any other lifeform.

"It is an escapist's paradise", said project co-ordinator for Bloodstone Ltd Tony Cox. "If you wanted to you could practically live your life within the game, escaping from the real world, meeting other people and taking on a completely new character".

Devised by author Rob Muir, Bloodstone covers 14 levels, with players aiming to rise to the rank of Lord. There is no surcharge for MicroLink subscribers who play during the day but a charge of 3p a minute is levied after 6pm.

SOS for games buffs

NOW here this! A bunch of *Amiga Computing* readers are holding a 30 hour computathon in an attempt to raise more than £1,000 for Rochford Hospital Special Baby Care Unit.

The industry has already responded favourably, with companies such as Electronic Arts, Mirrorsoft, Mindscape, CDS and Thalamus chipping in loads of games.

But what organiser Neil Mansell needs more than anything else is more people to play those games.

To qualify you must be about 15 to 16 years old, willing to use your own computer, get sponsored to the tune of at least £150, and stay up for 30 hours. The event will take place at Canvey Island, Essex, on May 26 from 9am on Saturday through to 3pm on Sunday. So if you've got nothing to do that weekend and fancy a good long waggle, get in touch with Neil pronto. Write to him at 53 St. Marks Road, Canvey Island, Essex, SS8 9NJ.

Who knows, you may even get your picture in the papers!

Brighter displays

ALLOWING up to eight monitors to be connected to a single computer, the new Multidat RGB distribution amplifier from Interactive Media Resources (0902 25444) is the latest product to put the Amiga at the centre of professional video

Power boost

AMIGA 500 owners who want to run MSdos software on their machines and increase memory up to 1.5Mb do not have long to wait. Latest news from Dutch developer KCS is that its eagerly anticipated PC Power Board is poised to go into full production and should be available in the UK during May.

As *Amiga Computing* went to press Jack Kaufman, of UK distributor Bitcon Devices, reported: "The first prototype of the board is nearly finished and when it is, KCS will make 100 available. If field tests prove it is OK, the company will go into heavy production by the end of April".

Offering PC emulation, the new board is aimed at serious Amiga 500 users who want to stay with the machine's graphic, musical and animation potential, but feel it has insufficient memory and is not adequately served by professional software.

Based around an NEC V30 processor running at

applications. Making a whole new range of facilities possible, Multidat uses RGB instead of video.

This means that graphics can be distributed down long lengths of cable without the degrading effects associated with video signals. This means that high resolution screens retain their clarity and colour detail.

The distribution amplifier is aimed at such applications as public information, advertising systems in shops and shopping arcades, bus stations, exhibitions and for teaching in both classrooms and lecture theatres.

There are two models, the basic Multidat with four outputs and the Multidat Plus with eight. Multidat costs £175 plus £5 carriage, Multidat Plus costs £300 plus £6 carriage. Scart output leads cost £5 each.

Way to the skies

FOLLOWING the news that the Civil Aviation Authority is using Amigas to train pilots, the editor of a leading aviation magazine has added to the growing belief that home flight simulators should no longer be perceived purely as games.

David Oliver, editor of Airforces Monthly, believes that they can be a good starting point for budding pilots.

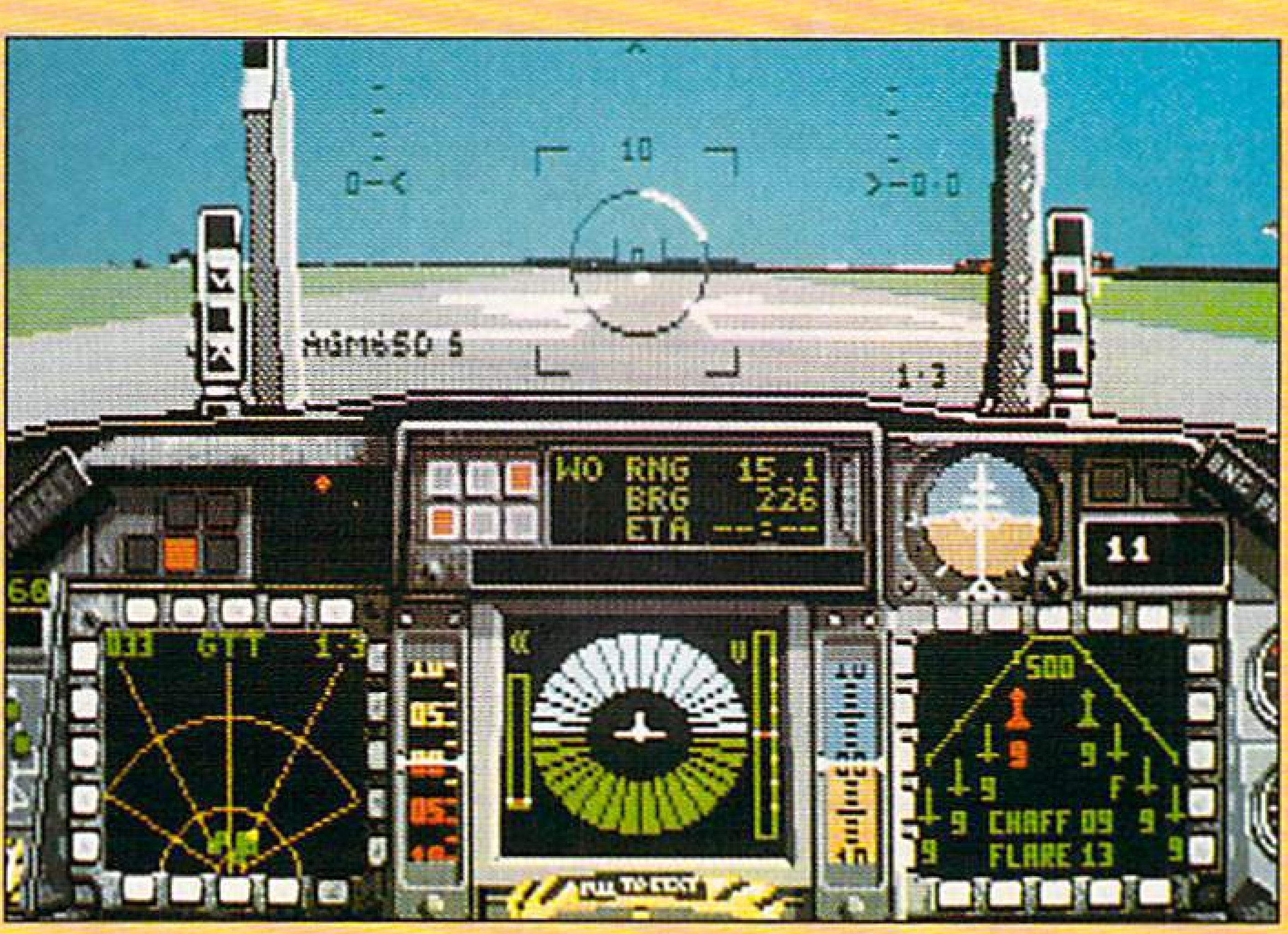
"Some of these products provide a strong educational basis on how to fly an aircraft", he said. "They even give an excellent insight into the workload and complexities of flying something as sophisticated as the F16 – the world's leading fighter plane".

His comments appeared in the March issue of his magazine, a respected title in the aircraft industry.

F16 Combat Pilot simulator, from Digital Integration, is typical of the new generation of "games" which have impressed the flying fraternity. Head of Digital Integration, Dave Marshall is himself a design engineer with experience on military flight smulators used to test some of the most sophisticated aircraft.

"We had more than five people working on F16 Combat Pilot solidly for two years", he said. "We endeavoured to make the game as realistic as possible and it has received much praise from airmen, including many former RAF pilots.

"A major sector of our market is boys in their early and midteens. We believe that the popularity of games such as F16 will increase the number of people whose ambition it is to be a pilot and at the same time improve both their aptitude and understanding of what it is like to fly a jet fighter".



Sequencer upgraded

AN upgrade of the popular KCS Midi sequencer has been launched by Dr.T Music Software and is being distributed in the UK by MCM (01-724 4104).

In addition to a host of standard, real-time and editing features, version 3.0 has improved AutoMix capabilities which include 16 channel banks of graphic sliders, realtime display, and generation of any Midi controller or program change, VU meters to show Midi activity and output mixers to KCS or Midi.

It runs standalone as a Midi monitor or fully integrated in MPE, sends snapshots of Midi data and includes a SoundCheck feature for setting up Midi systems or troubleshooting.

Price, £79.95. However, for the amateur musician who aspires to produce professional sounds, the Tiger Cub 12 track sequencer, which has proved popular on the Atari ST, is now available for the Amiga. Its features include graphic editing, score writing, print out, loop recording, one step object-oriented editing and a built-in conductor track. Price £99.

MCM was hoping to join with Commodore UK to reproduce on this side of the Atlantic an Amiga music bundle which has been launched in America through an alliance between Dr.T and Commodore US.

Including an A2000 with the KCS 3.0 sequencer, score writing package Copyist Apprentice and software, the American bundle has proved popular with Amiga music makers.

Mike Partridge of MCM said that the package was under negotiation with Commodore.

for the 500

7.14 MHz, the board is small enough to be installed easily into the A501 expansion slot beneath the machine without loss of guarantee.

It has an on board battery-backed clock and ram chips supporting both Amiga and PC with an extra 0.5Mb each. Phoenix Bios ensures MSdos compatability.

In MSdos mode the board offers 705k of available memory with a further 64k by using an Extra Memory Space Driver. In Amiga mode it offers 1Mb plus a 512Kb disc.

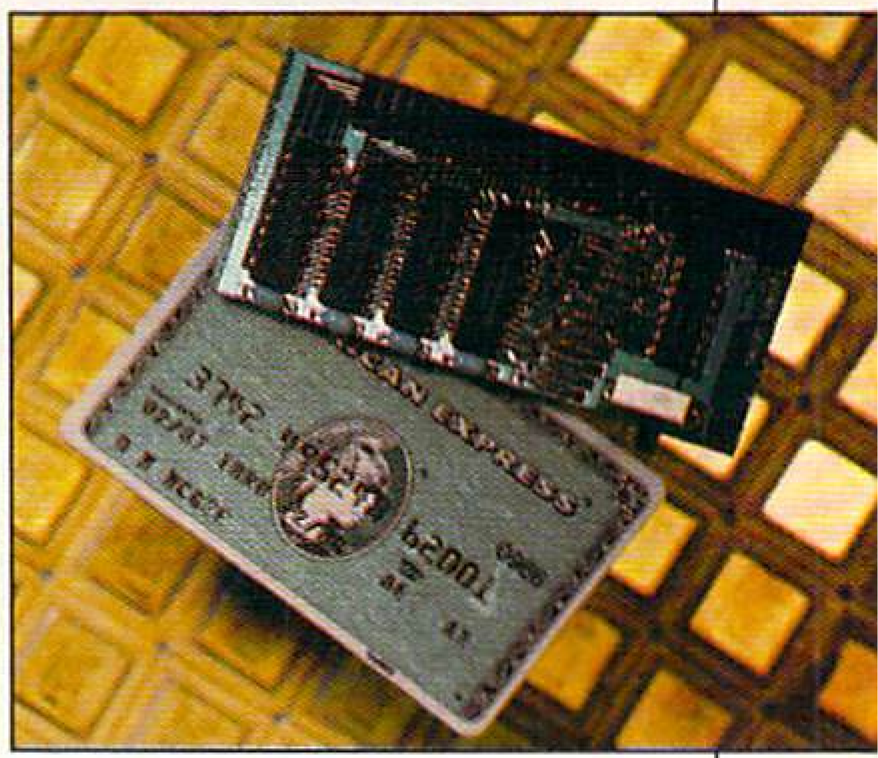
PC Power Board supports Monochrome, Hercules and Color Graphics Adapter video modes, 3.5in internal drive plus 3.5in and 5.25in external drives. Included with the board is MSdos 4.01, MSdos Shell and GW Basic. Price of the full package will be around £320.

Bitcon Devices is at 88 Bewick Road, Gateshead, Tyne and Wear, NE8 1RS. Fax, 091-490 1918.

That will do nicely

MEMORY Expansion Systems (051-236 0480) has brought out a new credit card-sized expansion board for the Amiga 500, claimed to be the smallest board on the market.

Providing 0.5Mb of extra memory, it is just four centimetres wide and is supplied with a 1Mb demo specially designed by a leading software development house. Price, £55.



Clocking in at speed

BILLED as the only MC-68030 accelerator to employ state of the art surface mount technology, Mega-Midget Racer is the latest turbo card from Computer System Associates of California.

The plug in card for Amiga A500 and A2000 machines, has been released by UK distributors Advanced Technology Holdings (0923 817548).

Evolved from CSA's Midger Racer, the Mega-Midget Racer features selectable clock speeds of 20, 25 or 33MHz, support for floating point maths co-processors at speeds of up to 40MHz, 32 bit 512Kb Sram for operating system kernel, 32 bit ram expansion bus and software selectable MC-68000.

The asynchronous design used through an easily changeable crystal oscillator and an optional MC-68881 or 68882 math co-processor can turn in clock speeds suitable for racing through number crunching applications such as CAD, 3D animation and ray tracing.

Also available is the less costly 20MHz 030 board which is still expandable to maximum performance.

An optional 512Kb, 32 bit Sram module allows copying the Amiga rom kernel into high-speed 32 bit Sram for lighting fast screen refreshes, page flipping, scrolling and image processing.

A full 32 bit wide expansion bus provides support for high-speed memory and I/O devices in 8, 16 and 32 bit configurations.

Advanced Technology Holdings assures users of software and hardware compatability by resocketing the standard MC-68000 on the board for easy software switching to either the MC-68030 or the MC-68000 operation.

Starting price for the Mega-Midget Racer is £649.95 with a 20MHz MC-68030 installed.

Take 1 – on an Amiga

A TEAM of programmers are working round the clock on a new Amiga based project which could revolutionise home movie making and be a useful asset for teaching children with learning difficulties. They are aiming to have it ready for the market by May.

The animation system and software will be a cheaper version of an existing professional set-up based on the Amiga 2000 and costing £8,500 from market specialists Chromacolour (01-675 8422). It will be for use with the Amiga 500 and will cost around £2,000. Commodore has placed its weight behind the new system.

"This smaller version of our existing professional system will become a home movie making unit", said Roy Evans of Chromacolour.

"If people have an Amiga 500, our package, a TV and video recorder they will be able to make their own animated movies, off-load them to video and show them on television to their families".

Great interest has also been shown in the educational potential of the system for children with learning difficulties. Its ability to take images, move and colour them makes it ideal for stimulating interest.

It has been under test at SERT, the London based unit which assesses learning aids for disabled children and will soon go out on test with educationalists to see how it can be adapted for those with specific problems.

Marketing's new chief

NEW marketing manager at Commodore UK is Dawn Levack, who previously spent nine years with Wang Computers holding various managerial positions, culminating in the job of marketing communications manager.

Before working for Wang, Dawn held positions at Prime Computers and the Beecham Group.

She will head the marketing department with responsibility for both leisure and business machines. Her brief is to add structure to the department and concentrate on the PC side of Commodore's operation.

Another recruit to Commodore's new arm is former Philips Consumer Electronics man Steve Paul (32) who takes up the position of marketing manager for consumer products with Commodore Marketing International.

At Philips he was responsible for strategic marketing of new products having worked for the company from 1985.

He previously worked for four years in product development for Philips Lighting.

Commenting on the appointment, Peter Bayley, Commodore's vice president of international marketing said: "Steve's extensive experience and his knowledge of the consumer electronics market will add greatly to the strengths of our new international operations.

"He will be working to ensure that Commodore continues to develop its position at the forefront of the dynamic European home computer market".

Hackers beware

JUST when it seemed that the recent Law Lords report on computer misuse was destined for a Whitehall waste bin, a stroke of good fortune has turned into an unlucky break for hackers.

After coming third in the House of Commons lottery to decide which MPs will be allowed to raise Private Member's Bills, Michael Colvin MP has opted to resurrect the hackers charter which recommends jail for certain cases of data theft.

When the computer misuse report was published by the Law Commission at the end of last year, it was tipped for discussion in the government's current session but was edged out by more pressing legislation. With his Private Member's Bill, Mr Colvin now hopes to make the report law.

All the colours, especially green

AS well as launching into more full colour, *Amiga Computing* is going green. Future issues will be printed on paper manufactured in a way which is kinder to the environment.

Publisher, Interactive Publishing, is to use paper made in Scandinavia under the tight ecology rules imposed on mills there.

To reduce tree felling, it comes from the waste off-cuts of other wood processes such as furniture making also employing a new chemithermo-mechanical process which makes more economical use of wood than older methods.

Coating of the paper further improves the environment by using slurry from the Cornish china clay industry.

Strict water purification plays an important part in its manufacture and the potentially damaging effects of chlorine bleaching have been eliminated.

The paper comes from wood grown in the forests of Finland and Sweden where meticulous records are kept and trees are grown to maturity faster than they are felled.

"When we decided to move over to paper made by more ecologically sound methods, our problem was to find a quality product which would support Interactive's improved production technology", said the company's commercial director David Hirst.

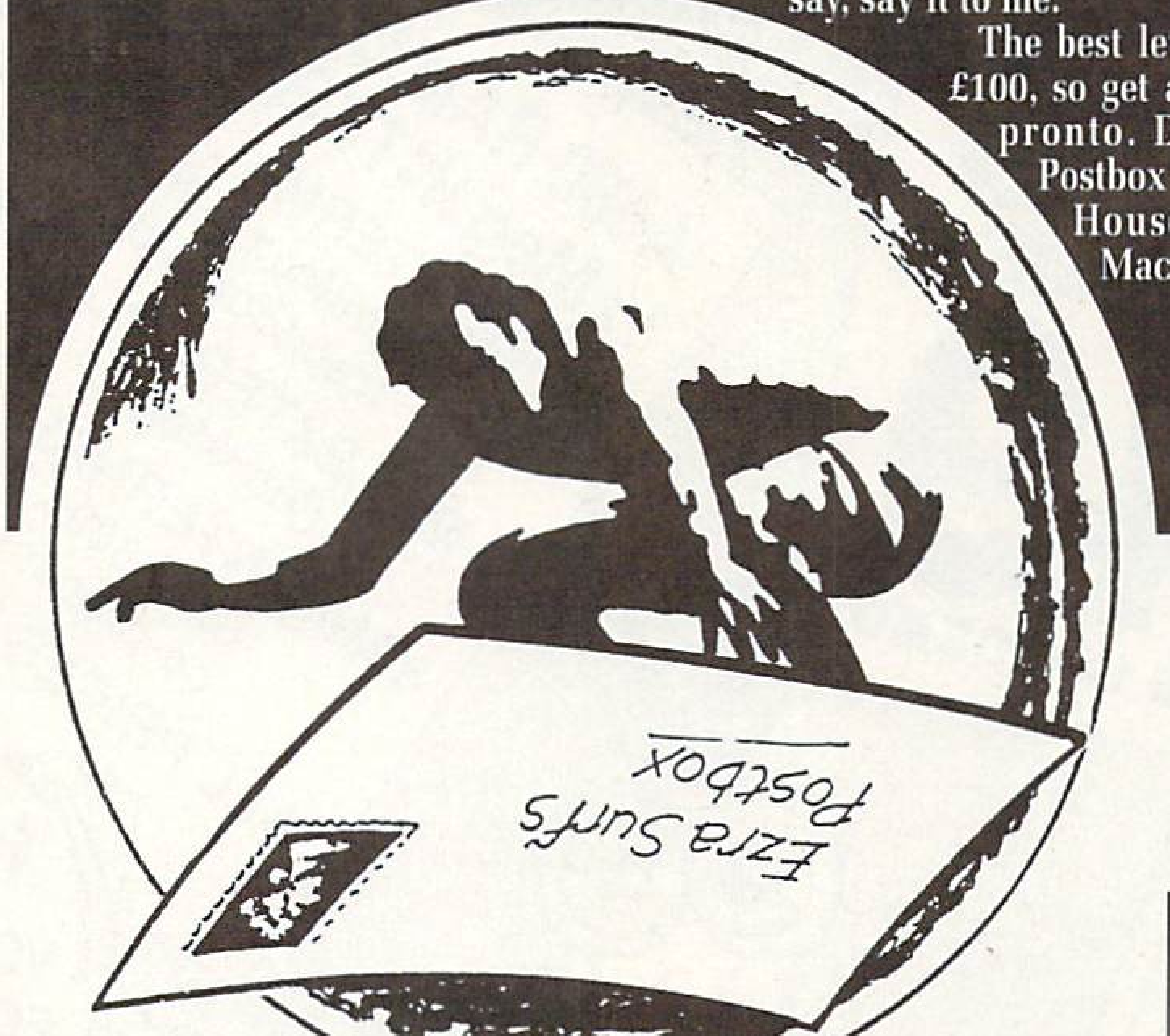
"We believe we have now found the right answer. This paper cuts down the use of natural resources, eliminates potentially harmful processes but will allow us to retain the high standards of print and colour reproduction which readers of *Amiga Computing* have come to expect".


Virgin Games
DAN DARE III
The Escape
IBM PC
ATARI ST
AMIGA
CBM 64
SPECTRUM
AMSTRAD
IBM PC £24.99
ATARI ST £19.99
AMIGA £19.99
CBM 64 £9.99 (CASS)
£14.99 (DISC)
SPECTRUM £9.99 (CASS)
£14.99 (DISC)
AMSTRAD £9.99 (CASS)
£14.99 (DISC)

Hi, I'm the mail man. Man. It's my job to sort your scribblin's and spill the beans on the problems we all have when DF0: starts to whirr. So if you've got something to say, say it to me.

The best letters will be sent prizes of up to £100, so get a copy of Protext into your drive pronto. Drop me a line at Ezra Surf's Postbox (ESP), Amiga Computing, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

Ezra



Don't believe what you read

DID you see the competition in the TV Times at Christmas? What a load of rubbish! The prize was even more atrocious, five Atari STs which were so highly recommended that it made the poor little old Amiga look like a ZX81 without extended ram pack.

Since when have we ever envied an ST owner? I pity them myself! Is this the only way that Atari can get rid of their stock?

This next quote comes from page 133 of the TV Times: "The ST owner is the envy of all other computer users. Its powerful processor makes the machine ideal for entertainment, or creative or serious use".

Isn't their a law against misleading the public?

Marcus Steward,
Swindon,
Wiltshire.

I used to work with a girl who now writes for TV Times. Suppose that explains a lot. As it is the second best selling magazine in the country (Radio Times is number one) it must be right. I expect you to junk your Amiga straight away and buy an ST.

Come on, do you really expect the magazine to say "we couldn't get Amigas so settle for a computer which isn't quite as good?"

Bin Basic

YES, it's true. As you stated, Amiga Basic is seriously crippled. For a while the error you described with the Fruit Machine proggie on the January cover disc had me scratching my head too. I conceded by agreeing with you, had a bit more fun with it, and put it away to carry on with my other projects.

A bit later on I decided to show the program to my wife (she loves bandits). This time I already had my own Workbench on, so I loaded the disc with my Workbench still in memory, clicked on the icons as required and waited patiently for that dreaded "internal error" window to flash on.

It never came, and Fruit Machine kept on loading happily with the exception that my WB did not have the required font you designated for the program. Apart from that it worked well.

The conclusion is that this time Amiga Basic isn't to blame and that perhaps there's a file missing from cover disc which Fruit Machine requires. I have not had the time to figure out which file that would be.

Frank X Buttigieg,
Victoria,
Australia.

Nope, Jeff "The Disc" Walker is sure it's a bug in Amiga Basic, something to do with speed of disc access. Before he optimised his master copy of that month's cover disc, Fruit Machine ran fine.

Power down

YOUR letter from S. C. Claphoe sounded frighteningly familiar because I too have experienced problems with Diskcopy with my 1 meg, two floppy A500.

I have found that occasionally Diskcopy fails when both discs are inserted and Return is pressed; the internal drive whirrs and nothing happens. Just today I was amazed to discover that this program failed on three copies of Workbench that I had.

I wasn't sure whether to blame the software or hardware, or even workbench, for this trouble so I switched the machine off for about 10 seconds and re-booted.

What happened? Diskcopy failed to work, as before.

Desperate by now, I switched the machine off for roughly five minutes because I have heard that doing this will totally power down the machine. To my relief it worked, and Diskcopy managed to duplicate with no trouble at all.

I suggest that S.C.Claphoe tries doing the same before making a new copy of Workbench. He might also like to try using Diskdoctor to see whether or not the file is corrupted. I used Diskchecker – as found on a recent cover disc – and it reported no errors at all.

David Carter,
Woking,
Surrey.

➤

Mighty Joe

PETER RIVETTS' idea of research seems to be three tabloid articles two hours before a deadline. He simply doesn't know what he's talking about; the article (No harm done, December 1989) is biased, unbalanced, bigoted, infantile – an insult to the intelligence of your readers and an insult to the intelligence of those he is attacking.

I've written demos and games on the Amstrad, I reckon that's double PR's experience straight away. He moans about crackers not writing games yet I know at least one who works full time for a software house. I program because I enjoy it. Writing a piece of code like a game is great fun, but after that you have level design, deadlines and, worst of all, trying to sell it. This is not fun, it's hell.

As for compatibility, every demo I've ever seen works on a 1000 with 512k and one disc drive, not PR's fantasy machine, as well as basic 500s. And, yes, I *would* be impressed by 64,000 bobs.

Some of the demos nowadays do things unthought of in '86. Whenever I write a piece of code I try to push the machine to its limits, a common philosophy which only produces better and better stuff.

Joseph Garner,
Holmes Chapel,
Cheshire.

Well, hactually, Mr Rivetts does know what he's talking about when he's got an assembler, or his copy of Modula 2, running on the Amiga.

The dislike of poor programming practice, trashing copper lists for instance, is the result of experience. When you are a mature programmer you know the grief a badly written program can throw up.



TRADE ENQUIRIES WELCOME

Send cheques to: Dept AC
Memory Expansion Systems Ltd.
Britannia Buildings, 46 Fenwick Street,
Liverpool L2 7NB
(051) 236 0480

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

Access · VISA

(051) 236 0480 • 24 Hour Sales
(051) 227 2482 • 24 Hour Fax



Relax – it's back!

This is just a tiny selection from the sackful of letters we received campaigning for the return of the cover disc. Grateful thanks to all of you who wrote in for providing Jeff with such a rich supply of ammunition to bolster his argument for the disc's return.

What goes next?

BEING a devoted subscriber I was not alarmed in the slightest to find that there was no cover disc neatly taped to the front of my magazine – Database Direct always slots them into the middle to ensure safe arrival through the letterbox.

Having scanned all the adverts, I started reading the Amiga Scene gubbins at the front. Imagine my alarm (dramatic sound effects) at finding the headline "Disc or discount?" plastered across the centre of page 9. After reading the article it became apparent that the cover disc had fallen victim of a proven formula (your cliché, not mine).

No Jolyon Ralph demo, no brilliant icons, no handy utilities, no interesting reader submissions, no magazine tie-ins – no hope.

Your article seemed to imply that being a means of "education and entertainment" was somehow betrayed by the presence of a collection of genuinely useful software which enhanced *Amiga Computing's* competitive edge in its market sector.

The article also points to the results of the disc survey which appeared in the November 1989 issue. I find it difficult to understand how a survey asking what we wanted to see on the disc could result in its disappearance. What happened? Did no one respond or something?

Amiga Computing has a very strong editorial, I fail to see how providing an excellent cover disc could detract from it in any way. The only tangible benefit from removing the disc is a substantial reduction in price. Big deal!

What do you honestly think would happen if you commissioned a survey with the question: "Which would you prefer, *AC* for £1.95 without a cover disc or AC for £2.95 with one megabyte of quality software?" I regret to say that you could find the answer to that question being painfully apparent at newsagents up and down the country.

Before the cover disc was axed *Amiga Computing* was my favourite Amiga magazine. Now that it has gone ... nothing has changed, I still value the magazine as the most comprehensive and witty source of everything Amiga.

There is no real point in me writing this letter. I suspect that the cover disc withdrawal goes well beyond the control of humble editorial beings – after all, you only write it, sub it, proof it, eat it, sleep it and live it. Some suit at Interactive has plainly got a byte in his bonnet about market strategy or inefficient use of resources or something equally bizarre. And I bet he thinks an Amiga is some sort of new car.

As long as you are there to write it, I'll be here to read it. But how long before another compromise? I can see it now on page 9 of *Amiga Computing*, June 1990:

"Colour or cheaper? ... After a lot of discussion with readers and the results of a survey in the colour pages we decided that a magazine should be a source of education and entertainment, not just a source of cheap colour piccies ... We have been able to bring the price of the magazine down to 95p ... We are also able to devote more time to photocopying it for you".

I exaggerate, of course. But by how much?

Eddie McKendrick,
Pandgbourne,
Berkshire

Valuable asset

READING the explanation as to why you have dropped the disc, it would appear that you have under estimated its value.

Unlike other magazines, who shall remain nameless, but I refer to Amiga Format, *they* palm the punters off with pointless demos and a hotch-potch of irrelevant PD, just to appease the god Profit, whom they worship.

You, on the other hand, used the disc to add an extra dimension to the magazine with article tie-ins, source listings, reader contributions and little gems like the workbench upgrade and PowerPacker.

Never mind. At least you haven't, like the rest, modelled yourself on Viz and can see that there is more to the Amiga than games. But I still think the disc was an asset as opposed to an incentive.

Chris Cannon,
Harold Hill,
Essex.

Can't believe it

I SHOULD have realised from the wrong date on the front of Volume 2, Issue 9 that you were about to take a backwards step. Although I can happily live without the game demos, the Protext demo with the follow-up articles was excellent. I would never have considered such an expensive program, but through your discs I am encouraged to save for a copy.

Cave Runner was for a period my most used program. Fantastic gameplay! I was looking forward to a screen editor on a future disc, with perhaps reader contributions to provide more puzzles. The art and music programs were excellent.

All this together with Basic programs that we didn't have to type in, plus the latest versions of virus killers and utilities, combined to provide a disc which complemented my computer beautifully.

I can't believe that anyone in your survey said they would prefer a cheaper magazine without the disc.

Alan Green,
Parkgate,
South Wirral.

At a loss

I FEEL that £2.95 was a far better price for what we got than £1.95 for the magazine alone, especially considering the quality of the discs.

They were far better than Format's "fill it with a duff demo" efforts.

What a loss to the expanding Amiga community!

James Gilmore,
Coleshill,
Warwickshire

It was the best bit

WHY oh why have you dropped the cover disc? OK, the mag costs a little more, I agree, but for all the bits the disc contained it was well worth the price.

Not only that, it was the *best* value for money disc on all the magazines. You have only got to look at certain other magazines with cover discs; they have only got about four or five items on them versus your average of nine or ten!

Anyway, this is just to register my complaint that you have taken the best part of the magazine away. It must be, it's the bit I look forward to each month.

Carl Beech
Stockton Brook,
Staffordshire.

Death to games

I WOULD like to add to Gerry Hall's views about the Amiga's annoying lack of recognition in practically every area of computing. Everyone seems to know how good the Amiga's graphics and sound are, but it doesn't seem to make any difference to sales, at least not until 1989.

The argument goes that the Amiga, with all its lovely dedicated custom chips, is great, but when you need to do something serious with it you'll come unstuck.

What you need, they say, is a good workhorse computer like the Atari ST. Sad. Those who believe this are crazy and don't fully understand how the Amiga works.

The basic Amiga setup is hard to use, admittedly, whereas the ST is ready to go and can be very fast with limited resources.

The Amiga cries out for peripherals. As a result a basic Amiga setup doesn't have the ram or the fixed storage space to show its true potential, and only will when you expand it.

This is off-putting to the majority of people and they misunderstand why AmigaDos appears initially slow and clumsy. There is little to match an expanded Amiga.

The biggest area of neglect has to be that of sound. Music-X is showing the musicians that they should migrate to the Amiga. What other computer, with the possible exception of the Archimedes, can offer so much in this area?

Firstly, the Amiga has great internal sound capabilities, thanks to Paula, but the main advantage is the Amiga's multi-tasking.

Musicians no longer have to reset their systems in order to load a new package. Instead they can use multi-tasking to run different packages that can combine to create a fully-featured, customised music studio.

What has gone wrong? In my view the old idea of the Amiga being a games only machine has to die. It has everything the others have, plus more. It now emulates the BBC, the PC, and the latest news suggests that Microsoft may even convert all MSdos software to AmigaDos if Amiga sales are high enough.

James Hannigan,
Selly Oak,
Birmingham.

In America attempts to sell the Amiga as a home/games computer flopped badly. Some US Amigans are pleased about this. You're right that the gamesy image of the Amiga does damage its reputation as a business machine.

Some claim that what the Amiga needs is a "killer application" – a program so good that people will buy the computer just to run that one piece, or type, of software.

Commodore US is working hard on an authoring system which may fulfil this role worldwide, but in the UK, which is the jewel in the Commodore crown, that killer application is games playing. If it serves to keep the Japanese console menace out of the country, I'm all for it.

Turning Blue

SOMEONE has to study mechanical engineering at college, and it's me. We use IBM compatible PCs. Please could you tell me what software or hardware I would need in order to run these PC programs on my unexpanded Amiga?

The PCs have 3.5in discs, so that's no problem. Would I just need a PC emulator? If so, which one is the best and where can I buy if from?

Mark Davidson,
Stockport,
Cheshire.

I get at least one letter like this every month. I then write a bit about how PCs stink, how the bridgeboard is one solution but you need a 2000, and even then you'd be better off buying a separate IBM clone. Sometimes I mention the Transformer, which is a software emulator, saying it's not worth having.

Now all this has to change because there is a cheapie (£350-ish) bridgeboard which goes in the trapdoor of an A500. For more details contact Bitcon Devices Ltd, 88 Berwick Road, Gateshead, Tyne and Wear, NE8 1RS.

One track mind

ADVENTURES adventures adventures adventures adventures adventures adventures. OK?

Eyal Teler,
Jerusalem,
Israel.

Make a map, examine everything, save as you go. OK?

The secret's out

IT ALL started with this new secret club I have with my pals at college. We exchange information on machine code for most computers.

I have many problems to solve: Jolyon Ralph said that to prevent upsetting the system one must turn off multi-tasking. Well, in some cases it's worked, in some it hasn't. First the printer prints its lines, then the system goes to hell. After turning on multi-tasking again, of course.

I can't print letters unless I have sent loads of them down the line or I make continuous loops that keep on sending letters. Please, please, could you explain?

Kevin Biscoe,
East Dean,
Sussex.

Fiddling with multi-tasking is a black art. Before you do such things you must learn some magic lines like "all metal bashers are brain dead" and "real programmers use Lint". Only people who know this seem to be able to get multi-tasking to work. Either that or they are called Jez San.

Such techie questions are best answered by a book. Go and blow £100 on the full set of Addison Wesley manuals. And get a copy of The Kickstart Guide to the Amiga.

Blunders

NEVER let it be said that *Amiga Computing* is the type of magazine that would affect detrimentally those impressionable ones among us. The concept of a well written magazine such as yours being the culprit of such dirty deeds seems unimaginable.

Alas, in the first *Amiga Computing* of the 1990's you have managed to slur your good name; the first issue of the decade includes a high level of smut totalling, well, one word. But one word is one word too many.

Consider page 9's "Hackers will go to prison". In the second paragraph it appears that Nicholas Ridley, Trade and Industry Secretary, is apparently inviting *pubic* comment to be sent to his department as soon as possible.

This raises a few questions in my mind.

What trades and industries is Nicholas the secretary of? What conclusions can we draw about his mentality? Should *Amiga Computing* check more thoroughly the spelling of words that could have disastrous effects when spelt wrongly?

Michael Finnelly,
Hounslow,
Middlesex.

I showed the editor your letter, Mike, and he couldn't wriggle out of it. You got him, one might say, by the short and curlies there.

Don't axe your NEC

OVER the past couple of issues you've had some letters about drivers for the NEC 8023 printer. We have an NEC PC 8023 printer at work.

It's one of the system printers on one of our Unix systems, it works alongside an Apple Imagewriter. They both have the same mechanisms, we think they may have the same control codes. The Amiga has an Imagewriter driver, it can't hurt to try it!

Anyone know anything about a Manessman Tally MT120 printer?

Paul Duncan,
Royston,
Herts.

Sounding off

WHICH sequencer do you think is the best for around £100? It would have to be Midi compatible because I would want to use it with my friend's Casio synth to make totally well 'ard music that I can listen to and put into my games.

Michael Marsh,
Atherstone,
Warwickshire.

In the words of the Highlander (great film, you can get it on video): "There can be only one". And that one is Music-X Junior. Call MicroIllusions on 0480 496497 for release details.

AJ plants a tree

John "AJ" Kennedy gets to the root of some programming logic problems

HOW about some games programming? Not the machine code sprite, hardware scrolling, blasting innocent aliens kind, but a brief introduction to the games usually referred to as board (or sometimes bored) games and the Artificial Intelligence needed to play them.

Some useful programming techniques are involved, techniques which will stand you in good stead no matter what your current programming fetish.

When programming the computer to participate in a two-player game, there are three stages. First, represent the game using data structures; second, calculate a new move; and third, evaluate the current positions, discovering draws, wins and losses.

The first stage is usually a matter of defining arrays to store all possible positions. For example, a noughts and crosses game may use a structure such as that in Listing I.

Evaluating positions is sometimes tricky, but for a simple game it is rarely more than a dull slog. You should always be able to find ways of optimising this part of the code, but the more you do, the more complicated it becomes to understand.

Always be aware of the trade off between performance and complexity. Performance may win hands down on a machine code sprite routine for an arcade game – after all, you will probably never use it again. But if your code is a general purpose sort routine, you will want to be able to make slight alterations for specific purposes, perhaps even a new computer. If the code is written in gobbledegook you will have to start from scratch again.

The second section, move calculation, is where the fun starts. For a simple game like noughts and crosses you should be able to provide simple rules. If they are followed a game cannot be lost, only won or drawn. Strangely enough, the noughts and crosses rules can also be applied to Reversi – aka Othello – with only minor alterations.

However, imagine the list of rules needed for a game of chess. They would be so hugely complicated and following them would take so much time that a game would be unplayable.

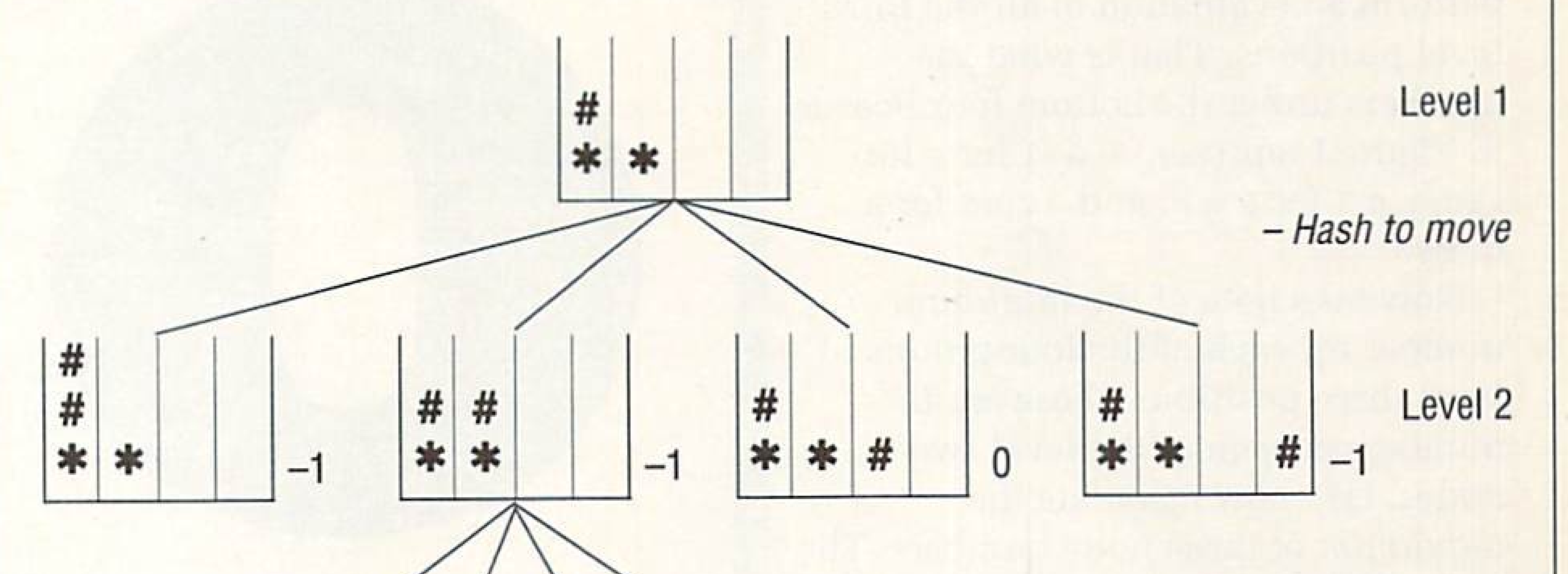
No one has ever even completed such a list, although it must exist, because the game has a finite set of possible positions. Even using a small fraction of this hypothetical list would leave large gaps in strategy and the computer would be a poor, and slow, player.

So we need a new technique. Something that can find the best possible move *within a given timespan*. Such a technique is called the minimax theorem. Sounds impressive, doesn't it?

It works by constructing trees from all the possible game positions. Trees are phenomenally important programming techniques and come complete with their own jargon. A typical tree has a start point, usually called the root. From it, branches lead off to various other possible nodes.

Sneek a peek at Figure I if you want to get the general picture. You could be picky and say that it should really be called an upside-down tree. I don't ➤

A section from the game tree for Three-in-a-Row



Listing I

```
'
' Example Data Structure for XOXs.
'
 OPTION BASE 1
 DIM BOARD(3,3)
 Blank=0:Nought=1:Cross=2
'
' Example routine to clear board.
'
 FOR x=1 TO 3
   FOR y=1 TO 3
     BOARD(x,y)=Blank
   NEXT y
 NEXT x
```

➤
really mind if you do. I did.

To examine the minimax theory and programming trees, let's make up a new game to experiment with. Noughts and crosses isn't a very good example in this context.

The game we shall use is called Three-in-a- Row, which will hopefully be familiar to you (in a totally non-copyright-infringing way, of course). The object is to get three similar shapes in a row – vertically, horizontally or diagonally. Shapes are dropped into vertical slots, with both players taking turns until the game is won or drawn.

Obviously the other player in our investigation will be the Amiga, running a program written in Amiga Basic, preferably compiled with HiSoft Basic Compiler to speed things up. Here is how the minimax theory works. First draw out the game tree for all the possible moves. Well, not all the possible moves because that would take a long time, so instead draw them out to a fixed number of levels.

In Figure I we have used three levels.

The first is a position in the middle of a game, the second contains all the possible moves which can be made by the person playing and the third contains all the responses made by the computer.

When the tree has been completed, perform an evaluation of all the third level positions. That is what the numbers under the bottom four boards in Figure I represent – a -1 for a lost game, a 1 for a win and a zero for a draw.

Now take note of the *minimum* number for each of the four groups of level three positions; these are the numbers at each of the level two nodes. OK, now calculate the *maximum* of these node numbers. The node with the maximum number is the one to follow.

Notice that Figure I represents the game after three moves have been made. To simplify things slightly not all the possible game positions have been drawn. In this case, it is the turn of Hash, who sees that there is only one possible move to make to avoid a Star victory – the third move from the left on level two.

When adapting the technique to other, more complex, games the hardest part of the coding will be the evaluation procedure. For a program like chess, this is where the real skill of the program is determined.

The evaluator must decide on the material worth of pieces, the current strategic strength and all the kind of stuff that Chess Masters spend years learning.

The minimax algorithm is only one of the possible techniques that can be used when programming a game. It belongs to the large family of Artificial Intelligence programming methods which form a fascinating area of study.

If you want to learn more about AI, visit your local library and look it up in the computer section. You will find plenty of books to keep you busy.

XOX rules

SOME tips to beat your friends at noughts and crosses.

- If there is a winning move, make it.
- Else, if a move must be made to prevent losing, make it.
- Else, if there is a corner available, move there.
- Else, If there is an edge available, move there.
- If all else fails, occupy the centre square.

Three in a row

THE program in Listing II looks as though it gets a bit tricky in places. This is mainly because Basic is not the best language for this kind of task. What would be best would be a language capable of withstanding recursive subroutines, like C or Pascal.

The minimax piece of code is in the routine GetHashMove. It works out the two extra levels in the game tree, position by position. If you aren't sure exactly what is happening where in the code, try scattering a few PRINT statements around to give you hints. Look on the bright side – if it was listed in C you wouldn't have the beginnings of a smidgen of a inkling of an idea what was going on.

When the program is run, a simple – and I mean very, very simple – representation of the playing board will be displayed. You must now choose the number of the slot in which to place your asterisk playing piece, by typing 1 to 4.

Now the computer will use its Artificial Intelligence to pick what it considers the best possible move. It calculates all the possible level two moves, then all the possible level three. Then the maximum of the minimum scores is calculated and the new move chosen.

Play continues until one of you wins or a draw results.

Listing II

```
'
' Three-In-A-Row, with artificially
' intelligent game tree technique.
' By John "AJ" Kennedy.
'
' (C) 1990 Amiga Computing.
'
 OPTION BASE 1
 DIM board$(4,4),test$(6,6)
 DIM lev2copy$(4,4,4),lev3copy$(4,4)
 DIM newcopy$(4,4)
 GOSUB ClearBoard
 GOSUB PrintBoard
game:
 GOSUB GetStarMove
 GOSUB PrintBoard
 Evaluate board$()
 IF f$<>"N" THEN endgame
 GOSUB GetHashMove
 GOSUB PrintBoard
 Evaluate board$()
 IF f$<>"N" THEN endgame
 GOTO game
endgame:
 PRINT "Game Over."
 IF f$="*" THEN PRINT "Star wins"
 IF f$="#" THEN PRINT "Hash wins"
 IF f$="D" THEN PRINT "A draw"
END

ClearBoard:
 FOR y=1 TO 4
   FOR x=1 TO 4
     board$(x,y)=" "
   NEXT x
 NEXT y
 RETURN

GetStarMove:
 INPUT "Please enter move  ",move
 IF move<1 OR move>4 THEN badmove
 IF board$(move,1)<>" " THEN badmove
 CALL InsertBoard(move,"*")
 RETURN

badmove:
 PRINT "Sorry - Invalid move."
 PRINT "Please try again."
 GOTO GetStarMove

PrintBoard:
 PRINT " 1 2 3 4"
 PRINT
   FOR y=1 TO 4
     FOR x=1 TO 4
'
'       The character between quotes
'       in the next line is a bar.
'       You'll find it on the shifted
'       backslash key (top row, right).
'
        PRINT "|";board$(x,y);
     NEXT x
     PRINT "|" ' The bar char again.
   NEXT y
 PRINT "---------"
 RETURN

GetHashMove:
'
' Use the minimax theory to pick
' a move.
'
' First duplicate the board into
' all level two arrays.
'
 FOR x=1 TO 4
   FOR y=1 TO 4
     FOR c=1 TO 4
       lev2copy$(x,y,c)=board$(x,y)
     NEXT c
   NEXT y
 NEXT x
'
' Now calculate second levels.
'
 max=-2:bestmove=0
 FOR branch=1 TO 4
   FOR x=1 TO 4
     FOR y=1 TO 4
       newcopy$(x,y)=lev2copy$(x,y,b
ranch)
     NEXT y
   NEXT x
   CALL InsertPiece(newcopy$(),branc
h,"#")
'
'    Now new$() contains hypothetical
'    new position.
'
   GOSUB Thirdlevel
   IF minimum>max THEN
     max=minimum
     bestmove=branch
   END IF
 NEXT branch

pickanother:
'
' If no best move, pick one.
'
 IF board$(bestmove,1)<>" " THEN
   bestmove=INT(RND*4)+1
   GOTO pickanother
 END IF
 CALL InsertBoard(bestmove,"#")
 RETURN

Thirdlevel:
'
' Calculate third level in game tree.
'
 minimum=2
 FOR move=1 TO 4
'
'   Make a copy of the second level
'   for each new third level.
'
   IF newcopy$(move,1)<>" " THEN GOT
0 trynext
   FOR x=1 TO 4
     FOR y=1 TO 4
       lev3copy$(x,y)=newcopy$(x,y)
     NEXT y
   NEXT x
   CALL InsertPiece(lev3copy$(),move
,"*")
   IF min<minimum THEN minimum=min
trynext:
 NEXT move
 RETURN

SUB InsertPiece(bd$(2),column,piece$)
STATIC
 SHARED f$,min,newcopy$()
'
' See what happens if a piece is
' inserted into playing board.
'
 min=0
 IF bd$(column,1)<>" " THEN f$="S":G
OTO plop
 y=0
godown4:
 y=y+1
 IF y=5 THEN drop4
 IF bd$(column,y)=" " THEN godown4
drop4:
 bd$(column,y-1)=piece$
 CALL Evaluate (bd$())
plop:
 IF f$="S" THEN min=-2
 IF f$="*" THEN min=-1
 IF f$="#" THEN min=1
 IF f$="D" OR f$="N" THEN min=0
END SUB

SUB InsertBoard (column,piece$) STATI
C
 SHARED board$()
'
' Put a playing piece in place.
'
 min=0
 IF board$(column,1)<>" " THEN
   f$="S"
   GOTO plop
 END IF
 y=0
godown5:
 y=y+1
 IF y=5 THEN drop5
 IF board$(column,y)=" "THEN godown5
drop5:
 board$(column,y-1)=piece$
END SUB

SUB Evaluate(brd$(2)) STATIC
 SHARED f$
'
' Copy board into test array and
' test for all eventualities.
'
 c=0
 FOR x=1 TO 4
   FOR y=1 TO 4
     test$(x+1,y+1)=brd$(x,y)
     IF brd$(x,y)<>" " THEN c=c+1
   NEXT y
 NEXT x
 f$="N"
 FOR x=2 TO 5
   FOR y=2 TO 5
     t$=test$(x,y)
     IF t$=" " THEN notest
     IF test$(x-1,y-1)=t$ AND t$=tes
t$(x+1,y+1) THEN f$=t$
     IF test$(x-1,y+1)=t$ AND t$=tes
t$(x+1,y-1) THEN f$=t$
     IF test$(x,y-1)=t$ AND t$=test$
(x,y+1) THEN f$=t$
     IF test$(x-1,y)=t$ AND t$=test$
(x+1,y) THEN f$=t$
notest:
   NEXT y
 NEXT x
'
' If no winner, and board full
' make it a draw.
'
 IF f$="N" AND c=16 THEN f$="D"
END SUB
```

Special Reserve

Can you afford not to join?

- Bi-monthly ***Buyer's Guides,*** each with reviews of 40 games.
- ***Release Schedules,*** issued with each Buyers Guide, with up-to-the-minute release information.
- ***Catalogue, Membership Card and Folder***
- ***Fast despatch*** of stock items, normally the day after receipt of order. Most lines in stock.
- Games sent ***individually*** by ***1st class post.*** Most fit through your letter-box.
- ***7-day hotline,*** until 8pm weekdays, 10 to 5.30 Saturdays, 11 to 5 Sundays.
- ***Written confirmation of order*** (with receipt).
- ***Instant refunds*** on request, if there is a delay.
- ***No commitment, no obligation to buy.***
- ***The best games, carefully selected, available at extraordinary prices.***

All for just **£5.00**
Annual membership.

We're miles cheaper than elsewhere. Below are a selection of offers at prices you might not believe. You can buy games at the same time as joining - or join now and select from our full catalogue. All items advertised are only for sale to members and are subject to availability.
Note: Upgrade to Official Secrets is offered to members of Special Reserve.



Now with Sim City or Drakkhen — Official Secrets

Members of Official Secrets get all the benefits of Special Reserve **plus:**

- ***Confidential.*** Our 32 page bi-monthly magazine is essential reading for those interested in adventures or role playing games. Written by experts, *Confidential* has covered everything from How to Host a Murder to Which F16 Flight Simulator? Our agents, led by the Master Spy known as "The Boss Upstairs", seek out the secrets of RPG's, FRP's, MUG's, PBM's, Leisure Suit Larry, The Russians, Elvira..... and more.
Note: You can subscribe to Confidential without joining the clubs for **£15.00** (UK) by entering **"CONFIDENTIAL SUBSCRIPTION"** on the order form.
- ***Myth.*** Written by Magnetic Scrolls, authors of The Pawn, exclusively for members of Official Secrets. Myth is a small adventure set in Ancient Greece. In it you'll meet The Ferryman, cheat Death and face the nine-headed Hydra. Myth includes the famous Magnetic Scrolls parser and graphics and is included in the price of membership.
Amiga Format said: "An excellent adventure... witty, cunning and just plain good fun! If you liked Fish! you'll probably like this, because they're very similar in style: you may even prefer Myth, it's that good!"
Myth Ratings: **Crash 91%, CU 90%, Amiga Format 87%, TGM 85%**
- ***Drakkhen (rrp 29.99) or Sim City (rrp 29.99).***
Of Drakkhen, ***ST Action said:*** "Drakkhen really impressed me. For me, the game was a subtle cross between my all-time favourite, Dungeon Master, and the SSI fantasy role-playing games. The graphics are superb.... Overall, Drakkhen is an excellent RPG, one that will take quite some time to beat" and ***Zero said:*** "Absolutely brilliant".
Of Sim City, ***ACE said:*** "Sim City is a politician's - or a gamesplayer's - dream....comparisons spring immediately to mind with Populous... but Sim City seems to have much more depth...." and ***C&VG said:*** "Sim City is utterly fab"
- ***Help-Line.*** Manned weekdays until 8pm and Sundays with solutions to most adventures.

Annual Membership **£27.99** with 6 issues of Confidential, Myth, Drakkhen or Sim City, Help-Line **and membership of Special Reserve.**

Amiga Software

3D POOL	15.49
A.P.B	12.99
ALTERED BEAST	15.99
ANARCHY	14.99
AQUANAUT	14.49
ARKANOID	12.99
ARTHUR (INFOCOM)	19.99
BACKGAMMON PROFESSIONAL	12.99
BAD COMPANY	15.99
BALANCE OF POWER 1990	15.49
BALLYHOO (INFOCOM)	16.49
BARBARIAN 2 (PALACE)	18.49
BARDS TALE 1	7.99
BARDS TALE 2	16.49
BATMAN THE MOVIE	15.99
BATTLE OF BRITAIN	19.49
BATTLECHESS	16.49
BATTLEHAWKS 1942	16.49
BATTLETECH (INFOCOM)	16.49
BEACH VOLLEY	15.99
BEYOND ZORK (INFOCOM)	24.99
BLACK TIGER	16.49
BLADE WARRIOR	15.99
BLOOD MONEY	14.49
BLOODWYCH	15.49
BLOODWYCH DATA DISK	9.99
BOMBER	18.49
BOMBER MISSION DISK	10.49
BRIDGE PLAYER 2150 GALACTICA	18.49
BUGGY BOY	8.99
C-LIGHT (3-D ANIMATION + DRAW)	31.49
CABAL	15.49
CHAMBERS OF SHAOLIN	14.99
CHASE H.Q	15.99
CHESS PLAYER 2150	15.99
CHESSMASTER 2000	15.49
CHRONOQUEST 2	17.49
COLLOSUS CHESS X	15.49
COLORADO	15.99
CONTINENTAL CIRCUS	11.99
CORRUPTION (M/SCROLLS)	13.99
CUTTHROATS	16.49
CYBERBALL	12.99
CYCLES	15.99
DAMOCLES	15.49
DATA STORM	12.49
DAY OF THE VIPER	16.49
DEBUT (PLANET SIMULATION)	15.49
DEJA VU	15.49
DEJA VU 2	15.49
DELUXE MUSIC CONSTR SET	46.47
DELUXE PAINT III	51.49
DEMONS WINTER (SSI)	17.49
DOUBLE DRAGON	12.99
DOUBLE DRAGON 2	13.49
DRAGON'S LAIR (1 MEG)	28.49
DRAGONS BREATH	18.99
DRAGONS OF FLAME (SSI)	17.49
DRIVING FORCE	16.49
DUNGEON MASTER (1 MEG)	15.49
DUNGEON MASTER EDITOR	7.49
DUNGEON QUEST	16.49
DYNAMIC DEBUGGER	16.49
DYNAMITE DUX	15.99
ELVIRA - MISTRESS OF THE DARK	19.49
ENCHANTER (INFOCOM)	18.49
ESCAPE FROM SINGE'S CASTLE	28.49
F16 COMBAT PILOT	15.99
F16 FALCON	18.49
F29 RETALIATOR	15.99
FEDERATION OF FREE TRADERS	19.49
FERRARI FORMULA 1	16.49
FIENDISH FRED'S BIG TOP FUN	17.49
FIRE BRIGADE - KIEV (1 MEG)	16.99
FISH! (M/SCROLLS)	13.99
FOOTBALL DIRECTOR 2	12.99
FULL METAL PLANETE	15.49
FUN SCHOOL 2 (2-6)	12.49
FUN SCHOOL 2 (6-8)	12.49
FUN SCHOOL 2 (8+)	12.49
FUTURE WARS	16.49
GALDREGON'S DOMAIN	12.49
GAUNTLET 2	7.99
GHOSTBUSTERS 2	15.99
GHOULS 'N' GHOSTS	16.49
GIN AND CRIBBAGE	17.49
GNOME RANGER (LEVEL 9)	9.99
GO PLAYER PROFESSIONAL	18.49
GOLD RUSH! (SIERRA)	16.49
GRAND PRIX CIRCUIT	16.49
GRAVITY	16.49
GREG NORMAN'S ULTIMATE GOLF	16.99
GRIDIRON (U.S FOOTBALL)	15.49
GUILD OF THIEVES (M/SCROLLS)	13.99
GUNSHIP	15.99
HARD DRIVIN'	12.99
HARLEY DAVIDSON	15.49
HILLSFAR (SSI)	17.49
HITCH HIKERS GUIDE (INFOCOM)	39.99
HOLLYWOOD HIJINX (INFOCOM)	24.99
HONDA RVF 750	15.49
HOUND OF SHADOW	16.99
INDIANA JONES ACTION	11.99
INDIANA JONES ADVENTURE	16.99
INFESTATION	14.99
INFIDEL (INFOCOM)	17.49
INTERPHASE	15.99
IRON LORD	15.99
IT CAME FROM THE DESERT (1 MEG)	18.49
I.C.F.T.D. DATA DISK	10.49
JACK NICKLAUS GOLF	16.49
JIG SAW	12.99
JINXTER (M/SCROLLS)	13.99
JOURNEY (INFOCOM)	19.99
KEEF THE THIEF	17.49
KENNY DALGLISH SOCCER	12.49
KICK OFF	12.49
KICK OFF EXPANSION DISK	7.49
KIND WORDS 2.0 (W/PROCESSOR)	29.99
KINGS QUEST 1, 2 & 3 (SIERRA)	21.49
KINGS QUEST 4 (SIERRA)	21.49
LANCELOT (LEVEL 9)	13.49
LASER SQUAD	12.99
LAST NINJA 2	15.99
LEADERBOARD BIRDIE	16.49
LEISURE SUIT LARRY 1 (SIERRA)	18.99
LEISURE SUIT LARRY 2 (SIERRA)	21.49
LEISURE SUIT LARRY 3 (SIERRA)	21.99
LIFE AND DEATH	15.49
LIGHT FORCE (R-TYPE, VOYAGER, BIO-CHALLENGE, IK+)	15.99
LIVERPOOL	11.99
LOMBARD RAC RALLY	14.99
LURKING HORROR (INFOCOM)	24.99
MAGNUM 4 (COMPILATION)	18.99
MANIAC MANSION	16.99
MATRIX MARAUDERS	12.49
MAVIS BEACON TEACHES TYPING	17.99
MICROPROSE SOCCER	15.99
MIDWINTER	15.99
MIND FOREVER VOYAGING	19.99
MOONMIST (INFOCOM)	19.99
MUSIC X	124.99
NEVER MIND	12.49
NEW ZEALAND STORY	15.99
NINJA WARRIORS	16.49
OIL IMPERIUM	16.49
OMEGA	17.49
OMNI-PLAY BASKETBALL	15.49
OMNI-PLAY HORSE RACING	15.49
ONSLAUGHT	15.49
OOZE	15.99
OPERATION THUNDERBOLT	15.99
P47 THUNDERBOLT	16.49
PAPERBOY	12.99
PAUL GASGOINE SUPER SOCCER	14.99
PAWN (M/SCROLLS)	13.99
PERSONAL NIGHTMARE	18.99
PHANTASIE 3 (SSI)	17.49
PHOBIA	12.49
PIRATES	15.99
PLANET BUSTERS	15.49
PLANETFALL	24.99
PLAYER MANAGER	12.49
POLICE QUEST 1 (SIERRA)	15.99
POPULOUS	16.49
POPULOUS PROMISED LANDS	7.99
POWER DRIFT	12.49
POWERDROME	16.49
PRO TENNIS TOUR	16.49
PROTEXT WORD PROCESSOR	64.99
PUBLISHERS CHOICE DTP (KIND WORDS 2, PAGESETTER 1.2, ARTISTS CHOICE, CAL FONTS, LASER SCRIPT) (1 MEG)	59.99
QUEST FOR THE TIMEBIRD	16.99
QUESTRON 2 (SSI)	17.49
RAINBOW ISLAND	15.99
RED LIGHTNING (SSI)	19.99
RICK DANGEROUS	15.49
ROBOCOP	15.49
ROCK 'N' ROLL	12.99
SCAPEGHOST (LEVEL 9)	12.49
SCRABBLE DE LUXE	12.99
SEASTALKER (INFOCOM)	19.99
SHADOWGATE	15.99
SHERLOCK (INFOCOM)	24.99
SHINOBI	12.99
SHOOT 'EM-UP CONSTR' KIT	18.49
SIDEWINDER	7.49
SILKWORM	12.99
SIM CITY TERRAIN EDITOR	9.99
SPACE ACE	27.49
SPACE QUEST 1 (SIERRA)	16.49
SPACE QUEST 2 (SIERRA)	16.49
SPACE QUEST 3 (SIERRA)	21.49
SPACE ROGUE	17.49
SPELL BOOK (4-6 YEARS)	13.49
SPELL BOOK (7+ YEARS)	13.49
SPELLBREAKER (INFOCOM)	24.99
STAR BLAZE	16.49
STAR COMMAND (SSI)	19.99
STAR WARS TRILOGY	15.99
STARCROSS (INFOCOM)	24.99
STARFLIGHT	16.99
STEVE DAVIS SNOOKER	12.49
STRIDER	16.99
STRYX	12.49
STUNT CAR RACER	15.99
SUPER CARS	13.49
SUPER LEAGUE SOCCER	15.49
SUPER WONDERBOY	15.99
SWITCHBLADE	13.49
SWORDS OF TWILIGHT	16.49
TALESPIN ADVENTURE CREATOR (1 MEG)	18.99
THE COLONY	17.49
THE LOST PATROL	15.99
THEME PARK MYSTERY	15.99
THINGS TO DO WITH NUMBERS	13.49
THINGS TO DO WITH WORDS	13.49
TIME	18.99
TOWER OF BABEL	16.49
TRIAD VOL2 (MENACE, BAAL, TETRIS)	14.99
TRIVIAL PURSUIT	12.99
TURBO OUTRUN	16.49
TV SPORTS BASKETBALL (CINEMAWARE)	18.49
TYPHOON THOMPSON	12.99
UMS - UNIVERSAL MILITARY SIMULATOR	15.99
UMS CIVIL WAR DISK	9.49
UMS VIETNAM DISK	9.49
UNINVITED	15.49
UNTOUCHABLES	15.99
VETTE (CORVETTE)	18.49
VIRUS	12.49
WAR IN MIDDLE EARTH	15.49
WARHEAD	15.99
WAYNE GRETZKY HOCKEY	15.99
WEIRD DREAMS	15.49
WILD STREETS	15.99
WINDWALKER	17.49
WISHBRINGER (INFOCOM)	19.99
WITNESS (INFOCOM)	19.49
WORKBENCH 1.3	13.49
X-OUT	13.49
XENOMORPH	15.49
XENON II, MEGABLAST	15.49
ZORK 1 (INFOCOM)	16.49
ZORK TRILOGY (INFOCOM)	29.99
ZORK ZERO (INFOCOM)	19.99

Sony 3.5" DS/DD 69p

Solution Books

BARDS TALE 1	3.99
CORRUPTION	2.50
DUNGN MASTER	2.50
FISH! SOLUTION	2.50
GOLDRUSH	6.99
GUILD OF THIEVES	2.50
HILLSFAR	7.99
HITCHIKERS GUIDE	7.99
JINXTER	2.50
KINGS QUEST 1,2,3 &4	10.99
LEISURE SUIT LARRY 1	6.99
LEISURE SUIT LARRY 2	6.99
MANHUNTER NEW YORK	6.99
PAWN	2.50
POLICE QUEST 1	6.99
POLICE QUEST 2	6.99
SHADOWGATE	2.50
SPACE QUEST 1	6.99
SPACE QUEST 2	6.99
SPACE QUEST 3	6.99

Amiga Specials

ADVENTURE CONSTRUCTION KIT	11.99
ARCHIPELAGOS	6.99
AUSTERLITZ	11.99
BAAL	6.99
BALLISTIX	6.99
BATTLE SQUADRON	12.49
BLACK CAULDRON	7.99
CAPTAIN BLOOD	8.49
CARRIER COMMAND	7.99
CHAMP FOOTBALL	4.99
CHRONO QUEST	9.49
CONFLICT EUROPE	6.49
DEFENDER OF THE CROWN	8.49
DRAGON NINJA	9.49
DRAKKHEN	14.99
EDDIE EDWARDS SKI	6.49
ELIMINATOR (1.2)	5.49
ELITE	9.99
EYE OF HORUS	6.99
F16 FALCON MISSION	7.99
F/TBALL MANAGER 2 PLUS EXPANSION	10.99
HIT DISKS VOLUME 2	8.49
HOSTAGES	7.49
HYBRIS	7.49
KARTING G.PRIX	4.49
KING OF CHICAGO	8.49
KINGS QUEST 2	6.99
KRISTAL	8.99
KULT	7.99
LEATHERNECKS	5.99
LORDS OF THE RISING SUN	9.99
MENACE	6.99
NIGEL MANSELL GP	4.99
NORTH AND SOUTH	10.49
PACLAND	6.49
PACMANIA	6.99
PASSING SHOT (TENNIS)	8.99
PHOTON PAINT	6.49
PURPLE SATURN DAY	7.49
REAL GHOSTBUSTERS	7.49
ROCKET RANGER	8.99
RUNNING MAN	8.49
SHADOW OF THE BEAST	12.99
SHOGUN (INFOCOM)	15.49
SIM CITY	14.99
SKYCHASE	5.99
SKYFOX	5.99
SPACE HARRIER 2	10.99
SPEEDBALL	6.49
STARGLIDER	5.49
STARGLIDER 2	6.99
SWORD OF SODAN	8.49
TEENAGE QUEEN	8.49
TETRIS	4.49
THE PRESIDENT IS MISSING	5.99
THREE STOOGES	6.99
THUNDERBIRDS	5.99
TIME & MAGIK	6.49
TURBO CUP	6.49
TV SPORTS FOOTBALL	11.99
VIXEN	4.49
VOYAGER	9.49
WATERLOO	10.49
WHO FRAMED ROGER RABBIT	7.49

SHADOW OF THE BEAST 12.99

INNEVITABLY, SOME OF THE ABOVE GAMES MAY NOT YET BE RELEASED. ALL GAMES ARE DESPATCHED AS SOON AS POSSIBLE. SALES LINES 0279 600204. PLEASE NOTE THAT THERE IS A SURCHARGE OF 50P PER GAME FOR ORDERS PLACED BY TELEPHONE.

Order Form

We only supply club members
Non-members please add the membership fee

Name ____________
Address ____________

Post Code ______ Phone No. ______
Computer ______ *5.25"/*3.5"/*3.0"/*TAPE

Payable to: Special Reserve or Official Secrets
P.O. Box 847, Harlow, CM21 9PH

Existing members please enter your membership number
Special Reserve membership £5 UK, £6 EEC, £7 World or Official Secrets membership £27.99 UK, £32 EEC, £36 World — £
with Drakkhen and Myth ☐ or with Sim City and Myth ☐

Item ______ £
Item ______ AMCOMP £

TOTAL £

Credit card expiry date ______

*CHEQUE/*POSTAL ORDER/*ACCESS/*VISA
(Including Connect, Mastercard, Eurocard, Switch etc)
* Delete where applicable

Overseas orders must be paid by credit card
Prices include UK & EEC Post and Packing
World orders please add £1.00 per item
For blank disks add 10% EEC or 25% World

Special Reserve and Official Secrets are trading names of Inter-Mediates Ltd.
Reg. Office: 2 South Block, The Maltings, Sawbridgeworth, Herts CM21 9PG.
Registered in England Number 2054713. VAT reg. no. 424 8532 51

Get the message?

Stewart C. Russell takes the easy road to inter-system communicatons

STRANGE things are happening; instead of using my normal word processor, this piece has been written with a PD text editor on an Atari ST and then spell-checked on an Amiga directly from the ST disc. The reason for this reckless and seemingly impossible task is CrossDos, Consultron's MSdos file system, which, since they use a similar format, can also accept ST discs.

The traditional method of communicating between two incompatible machines involves serial ports, baud rates and more wire than a fox terrier. This method is messy and, more often than not, does not completely work.

Rather than being a simple file copier – like Commodore's PC Utils or Central Coast's Dos 2 Dos – CrossDos can make use of any drive, so single drive users can make full use of the system.

The software can be mounted permanently via the Startup-Sequence, or temporarily from the CrossDos system disc. Installation is simple; a program asks you which bits of the system you want installed where.

It will even try to alter your Startup-Sequence to make itself auto- mount; this bit doesn't quite work and the file must be edited by hand.

Both 3.5in and 5.25in devices are supported, but Amiga drive mechanisms are unable to read or write high density (1.2 meg or 1.44 meg) PC discs. The current version of CrossDos can be set to create and use MSdos partitions on a hard drive, but only on an experimental basis.

There are also some programs to format floppies in ST or PC format, to check disc integrity and to toggle text filtering, since the other machines speak a slightly different dialect of Ascii.

MSdos discs bring up a proper Workbench icon, can be clicked open and Amiga applications run from them, complete with icons. The MSdos devices can be opened from any file requester, be it Deluxe Paint, Word Perfect or whatever.

Like any good AmigaDos device, mounting CrossDos initially has little effect; only when it is first used by an application will it take up memory.

CrossDos is a fit-and-forget product. Once installed, you don't ever have to bother with it. It isn't an emulator, but at £29 it is fairly inexpensive and it is extremely reliable. If you frequently have to use an ST or a PC, it's a product you must have.

More details from Power Computing on 0234 273000.

Getting the picture?

DJ Walker-Morgan discovers how to make a little sun shine on his Amiga

X is a graphics transport protocol, a big set of words which means "how to get points, lines, pictures and other graphics from one machine which *wants* to display them to another machine which *can*".

I'm sitting here with my Amiga using a program running on a Sun workstation in one window, playing with my 386 PC Unix desktop tools in another, and writing this with Amiga Notepad in a third – quite a neat trick, especially as I didn't need to modify the programs I am running to tell them about the Amiga screen.

How is this magic done? With X. What I have running on my Amiga is an X server program and an Ethernet board.

The Ethernet board lets me talk to other machines on the network in the office. It also lets my X server program listen to the other machines, who run X clients. An X client is a program which would like to display graphics, an X server is a program which can display graphics.

An X client could be a word processor, a paint program or a spreadsheet. All you have to tell the program is which X server should display the graphics.

In this case I want my Amiga to display them, so I set one variable and all the graphics will go to the Amiga. It's as easy as that. No worrying about different resolutions or different colours – X helps make that transparent.

X can talk to screens as plain as a monochrome PC or as extravagant as a 24 bitplane workstation, using the same software.

The really clever trick is that no X client program gets exclusive use of your screen, so clients on different machines can display on one server. I can use all the available software on my network, rather than just the software that works on the Amiga.

Best of all, thanks to its multi-tasking technology, the Amiga is the only "small" micro which can run an X server and X clients simultaneously. You'll search in vain to find an ST or PC doing the same. Plus you can pull the X screen down and still run Workbench programs. This makes the Amiga one powerful X terminal.

Alas all this graphic portability has a cost. On my Amiga I need 2 meg of ram and about 6 meg of hard drive.

To find out more about Dale Luck's X for the Amiga, call Amiga Centre Scotland on 031-557-3260.

Checkmate – the best move?

Is it possible to upgrade to an A2000 for less than the cost of an A500? John Kennedy checks out the rumours by asking the man who knows

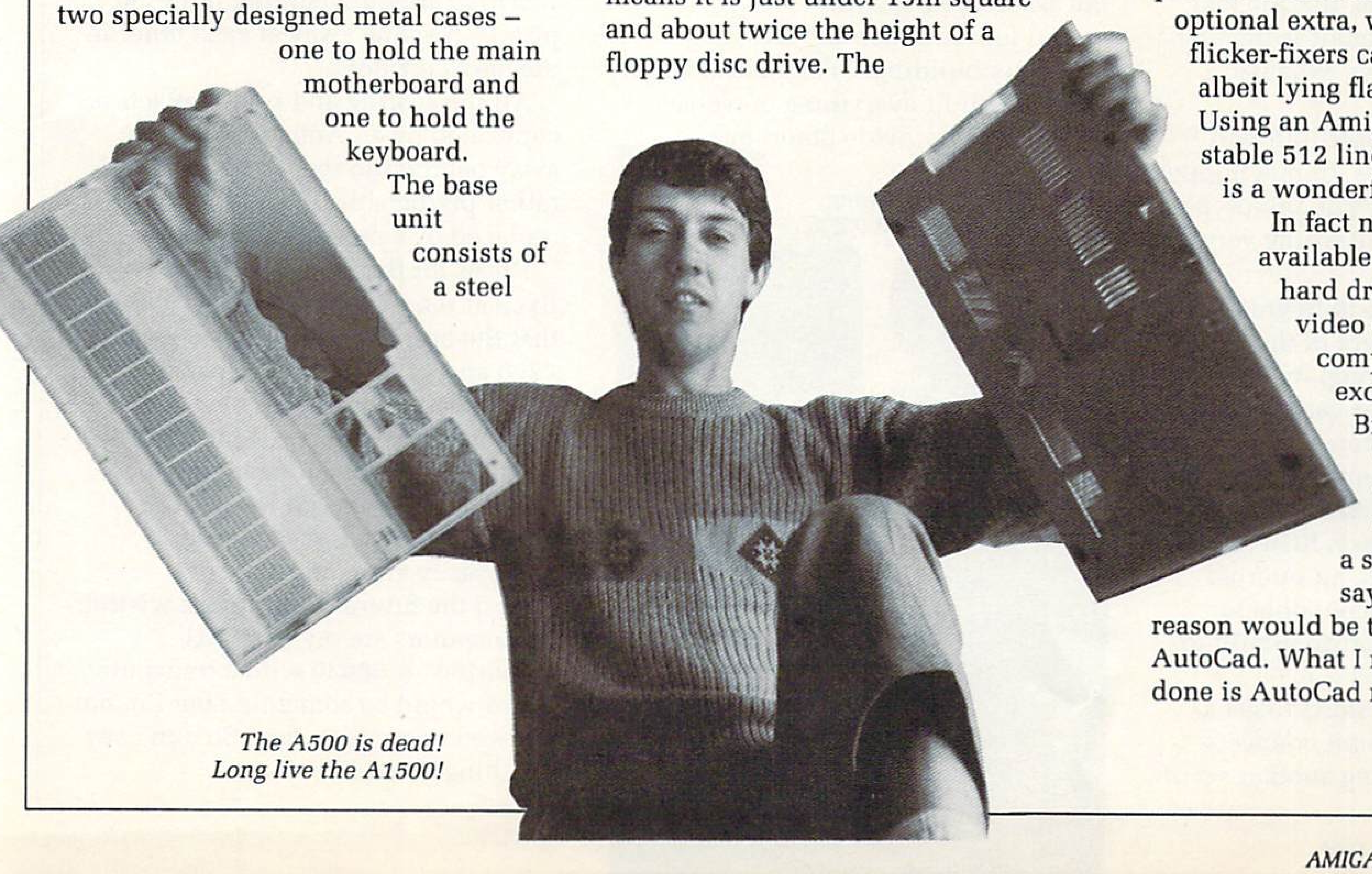
STEVE Jones points to the machine on his desk. "This is the way the Amiga should have been designed", he says, proudly displaying the prototype he's been working on for the past three months.

Hmmm. The A1500 certainly appears to be the ultimate peripheral for the A500 owner. It not only comprises a complete change of clothes for the fashion conscious, but also an expandability unheard of for the home user.

Effectively, the Checkmate unit tries to turn the humble A500 into a close copy of the A2000, something attempted before by various manufacturers but never quite carried off successfully. The main advantage of the 2000 over the 500 is the provision of expansion slots which allow peripherals on cards to be mounted internally. Hard drives, modems, video cards and processor accelerator boards can all be hidden away inside the machine, allowing the creation of a custom designed workstation.

The Checkmate upgrade solution means your beloved A500 is stripped of its plastic casing and re-housed in two specially designed metal cases – one to hold the main motherboard and one to hold the keyboard. The base unit consists of a steel box about the same footprint as an A2000, but only half the height. For those who haven't seen a 2000, this means it is just under 19in square and about twice the height of a floppy disc drive. The original keyboard, complete with red and green LEDs, is re-housed in a sturdy box attached by a curly cable to the main system unit.

Plastic feet of various heights will be provided to tilt the keyboard to any preferred typing angle. Immediately, the 500 loses any vestiges of a games console and becomes a serious personal computer.



The A500 is dead! Long live the A1500!

QUALITY of construction of both units is very high, with great care lavished on appearance. Schools will love the heavy duty metalwork which protects the Amiga from even the most enthusiastic young users.

The internal shielding from the 500 can safely be discarded, the heavy steel box being more than satisfactory for this purpose. The case provides a safe site for even the heaviest of monitors, for example a large multi-scan for flicker-free interlaced displays.

Flicker-free interlace on a A500? Isn't that impossible? Well it used to be. The A1500 unit will quite happily provide a full Amiga video slot as an optional extra, which means that flicker-fixers can be used with ease, albeit lying flat inside the case. Using an Amiga with a perfectly stable 512 line Workbench screen is a wonderful experience.

In fact nearly all the cards available for the 2000, such as hard drives, genlocks and video cards, are compatible. The only exception is the PC Bridgeboard.

"Why would people want to use a PC when they can have a system like this?" says Steve. "The only reason would be to run something like AutoCad. What I really want to see done is AutoCad re-written especially ➤



At last A500 owners can experience the joy of an interlaced Workbench without flicker

➤ for the Amiga. That would be nice".

The recently announced PC board for the 500 should pacify any users desperate for compatibility with yesterday's technology.

SO what is in it for the vanilla A500 owner? Initially the re-positioned sockets and disc drive will be well appreciated, and the separate keyboard is a definite computing equivalent of fluffy-dice. But the real point of the A1500 is that it is the first rung in a comprehensive expansion system.

The disc bay in the base unit will house two floppy drives, or one floppy drive and a hard drive. The prototype had a Commodore A590 sitting very happily inside it.

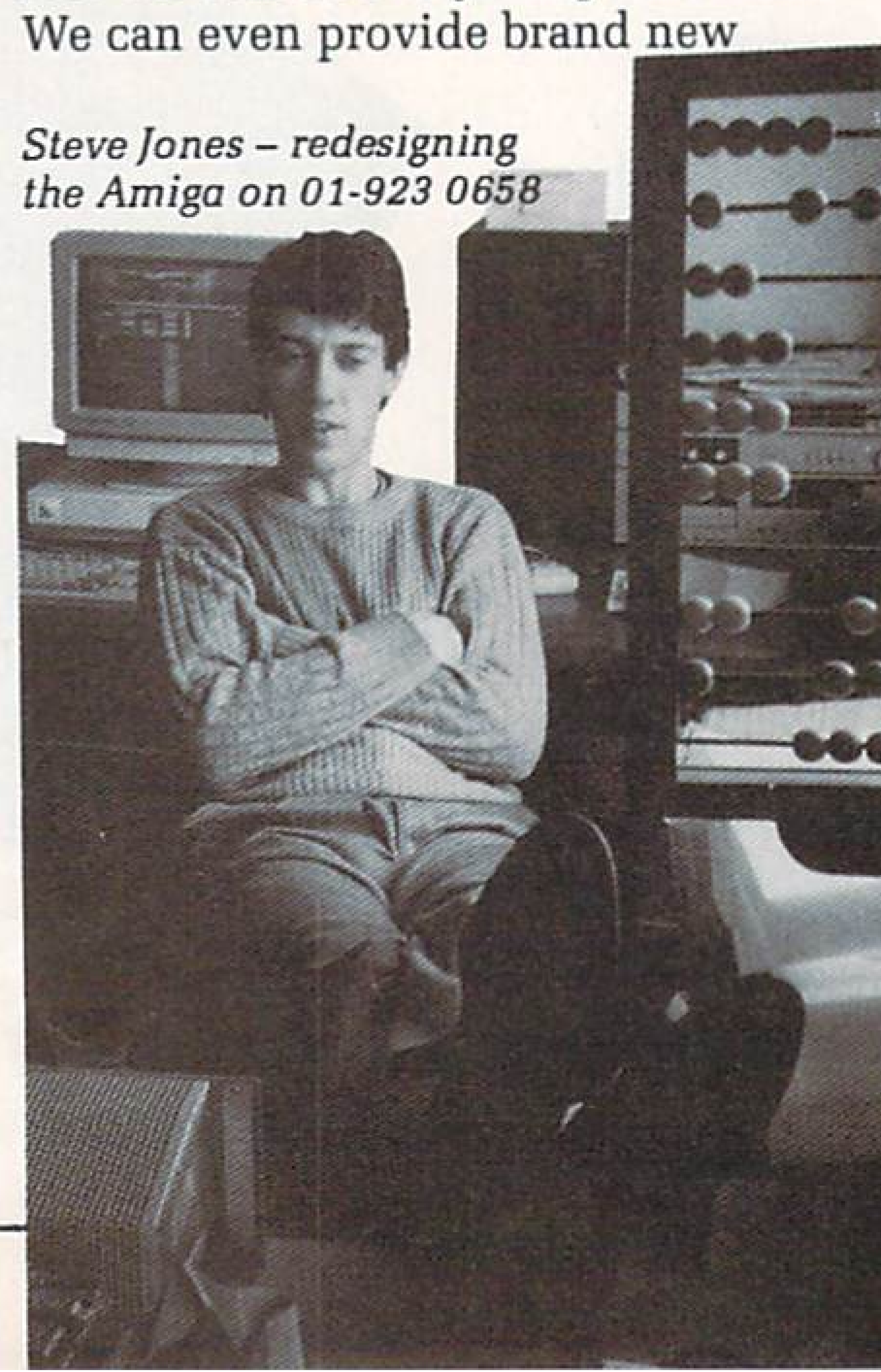
When the user wants to upgrade further he can feel secure in the knowledge that everything will be safely housed inside the case. Due to clever use of pop-out front panels and IDC ribbon cables the entire unit can be customised to an incredible degree; an integral Midi interface, RGB signals brought out to the front, an internal video digitiser – all are possible to enable the A500 to be custom-built to exact specifications.

And if the base unit starts to get a bit full, an expansion unit connects snugly on top, providing another set of three slots. If all these are somehow filled, yet another expansion box can be stacked, and another if need be. You would probably run out of ideas before running out of slots.

But what about the owner who doesn't want to take his A500 apart? After all, it does require invalidating the original guarantee, and not everyone is too keen on risking their investment.

"We thought of that", says Steve. "We will provide our own warranty, the length of which will depend on the age of the machine".

And for those not into DIY computer building? "For a fee of about £50 we will fit everything ourselves. We can even provide brand new A500s already converted if that's what people want."



Steve Jones – redesigning the Amiga on 01-923 0658

It will be possible to use the A1500 in professional 19in rack- mounted systems, something which will immediately cause Amiga musicians to salivate.

"Everyone is really keen on the prospect of running Music-X in a rack along with a couple of synthesisers", Steve smiles. "A certain space administration is also interested in the idea of a rackful of Amigas. I'd love to be able to say 'As used by Nasa'".

ALTHOUGH Steve and partner James Campbell form the management of Checkmate – soon to change its name to Checkmate Digital – the A1500 is the brainchild of freelancing engineer and part-time genius, Mick Roots.

"It's his baby", says Steve, "we have both been working on this project for no pay for the past three months. We are convinced it is the most important development for the A500 ever".

In between telephone calls from Mr Public, keen to agree with this view, Steve showed me around the Checkmate laboratories. In the corner of one room we found a box full of futuristic firearms and plastic body armour covered with flashing lights. Steve explained they were Photon Blasters from one of the newest and most exciting kind of video games in Blackpool – the fully interactive sci-fi adventure.

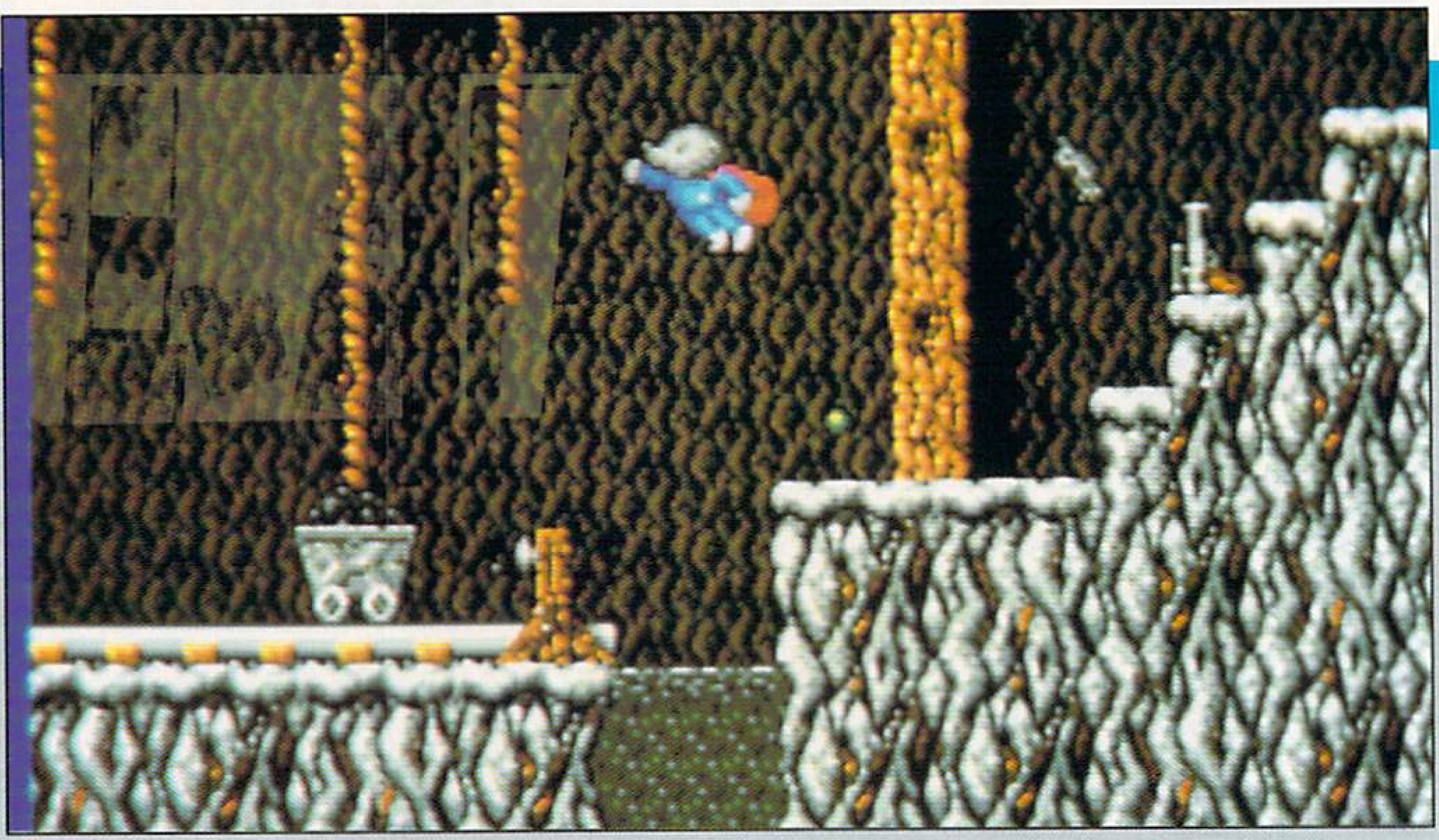
Players take part in the game and run around a maze wearing the light sensitive armour, carrying infra-red pistols, blasting away at each other in the dark corridors.

All the scoring and sound effects are controlled by an Amiga, beavering away behind the scenes. Perhaps rather predictably, it will soon be replaced by a rack-mounted A1500.

Prices for the units had yet to be fixed at the time I visited, but it seems that the base unit will cost between £200 and £230, and the expansion box about £150. It may sound expensive, but compared to the price of an A2000 it represents a considerable saving. What's more, you can pay for the expansion as you need it, not necessarily all in one go.

And the future? Steve looks wistful: "Transputers are my personal favourites. A 68030 with a transputer board would be something but I'm not allowed to mention that. So don't say anything about it".

Holy moley!



POSSIBLY the only game character ever to appear on the News at Ten is to star in a new game from Gremlin. Apparently demand for the return of Monty, hero of Monty Mole, Monty is Innocent and the rest, is so high that Gremlin reckons it can turn him into a giant merchandising concern.

Impossimole is a platforms and ladders game with "a modern Japanese feel", it says here, as Monty fights against Eskimos, parrots and giant ice-cream cones.

Impossimole will be exploding into the mass media circus around mid April, price £19.99.

Tanks, and tanks again

AMIGA owners are in fear of being overrun by tank games. One of the best looking so far is Sherman M4 from US Gold.

A varied landscape and different missions should provide long term interest in what is to be a realistic war simulation. Features include mines, trees, bunkers, rivers, bunkers, bridges, houses and bunkers.

Seven different realistically simulated vehicles will appear in re- runs of the Normandy invasions, the Ardennes campaign and the Duel with the Desert Fox. Things have come a long way since BattleZone, eh?



THE guys at Random Access (aka The Sales Curve) are getting a bit ahead of themselves. Every real gamer must remember their classic shoot-'em-up, Silkworm, which scored 96 per cent and a Supreme gong back in last June's *Amiga Computing*.

Instead of following the normal route of devising a fiendish sequel and adding the motif II after the name, these boys have decided to call it Silkworm IV, because it is so much better, they say. Why not Silkworm MCMXC, you may ask. And why no?

Most of the design philosophy seems to be of the uncompromising variety. We had a look over the programmers' brief and it seems to contain lots of words like wonderful and amazing.

Silkworm IV will feature the



Silkworm IV programmer Ronald Weeserick

All the latest news on the games software scene

Net profits



LOOKING to scoop more than a few runners-up medals during the coming football extravaganza, Virgin is working on the conversion of World Cup Soccer '90 from the hit arcade machine. The work is to be undertaken by Hungarian development team, Andromeda Software.

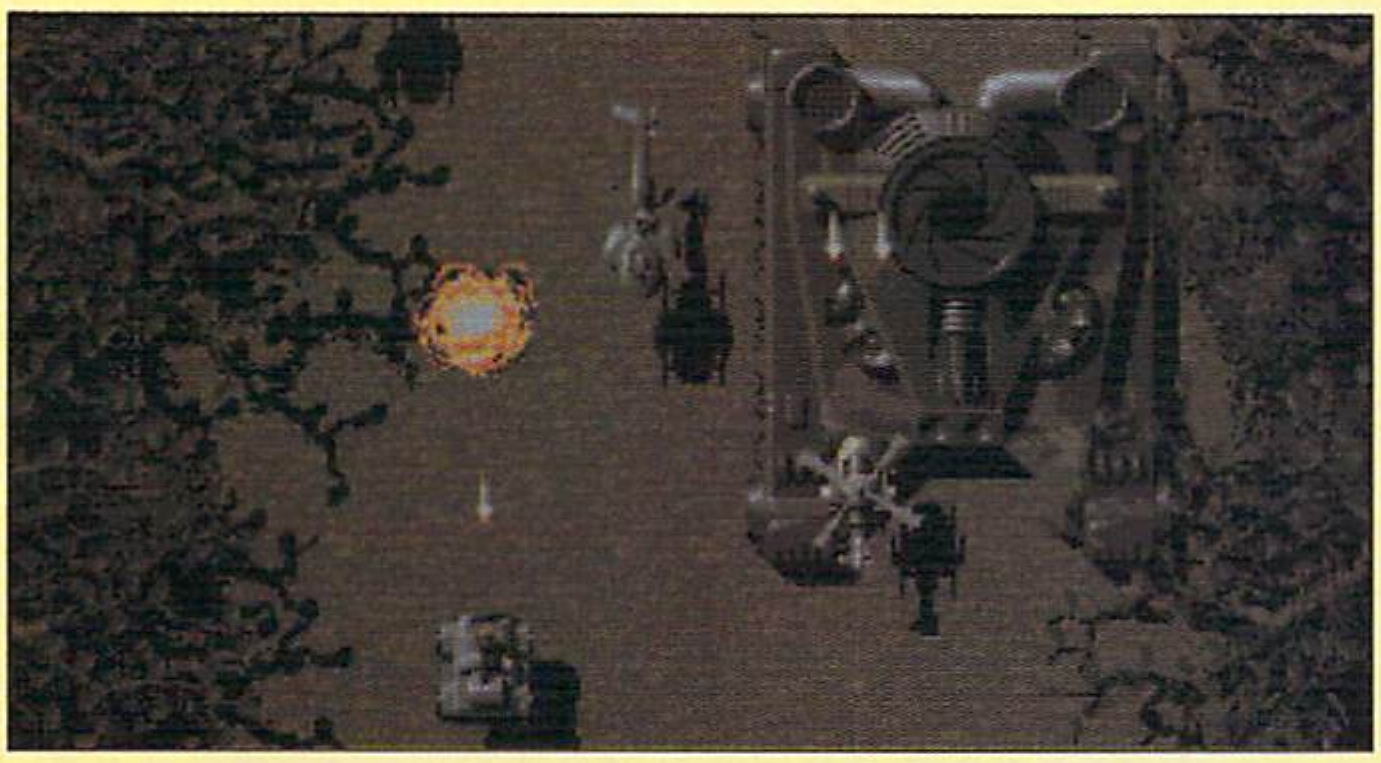
Features will include free kicks, corner kicks and throw-ins. Wow! Presumably it will also include advanced features like kicking the ball and running up and down the pitch.

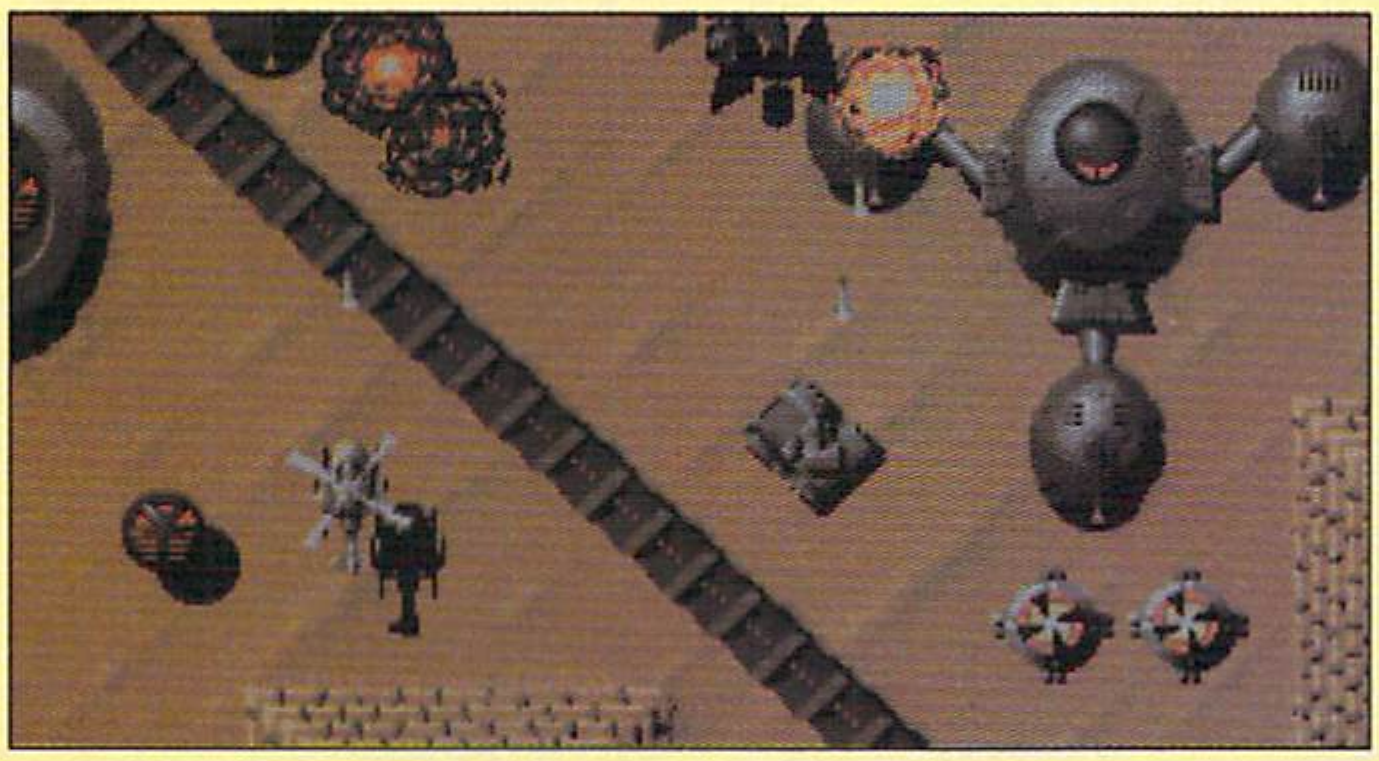
Follow the worms

characteristic Random Access intelligent loader system, where subsequent levels load in while the game is playing.

Some of the changes from the original, apart from a complete re-design of all the graphics (a full PAL screen is promised!) and overhaul of the gameplay, include an updated jeep and helicopter. In Silkworm IV both vehicles will have individual playstyles, but this time the Jeep won't be at a disadvantage.

Also promised are aliens, large aliens and then some amazing aliens. It looks good. Watch this space for updates.





LOGOTRON, the company which brought you StarRay and Archipelagos, is launching a new label to reflect its now independent position in the market place.

Among the titles to be published on the new Millennium label will be Thunderstrike, Cloud Kingdoms and Resolution 101, as well as Kid Gloves, featured in last month's Amiga Arcade.

REVIEWED THIS MONTH

96% Rotor
85% Escape from Singe's Castle
85% Rings of Medusa
84% Risk
81% E-Motion
81% Lost Dutchman's Mine
81% Rennaisance
80% Rainbow Islands
78% Hunter Killer
78% Sideshow
78% Soldier 2000
75% Aquanaut
72% Typhoon Thompson
68% Black Tiger
68% Cabal
67% Soccer Manager Plus
52% Fire
47% Italia '90

MAX HACKS

- Faery Tale
- Fighter Bomber
- Helter Skelter
- Magic Marble
- Prison
- Sim City
- Sword of Sodan
- Test Drive 2
- Wizball

See more aliens

TEN years ago the biological survey ship BSS Jane Seymour left Earth to seek out strange new life forms and other clichés.

Unfortunately it got bathed in deadly radiation, the way these things do, and everything went completely wrong, including the hold full of aliens mutating and running amok around the ship.

In Federation Quest One you play the rôle of the guy who has to sort this mess out. It's a one-player game against the computer, combining elements of strategy, real-time action against the clock and role-playing.

Gremlin says there will be 100 rooms, 20 levels of play, more than 200k of sampled sound effects and a collection of other impressive numbers.

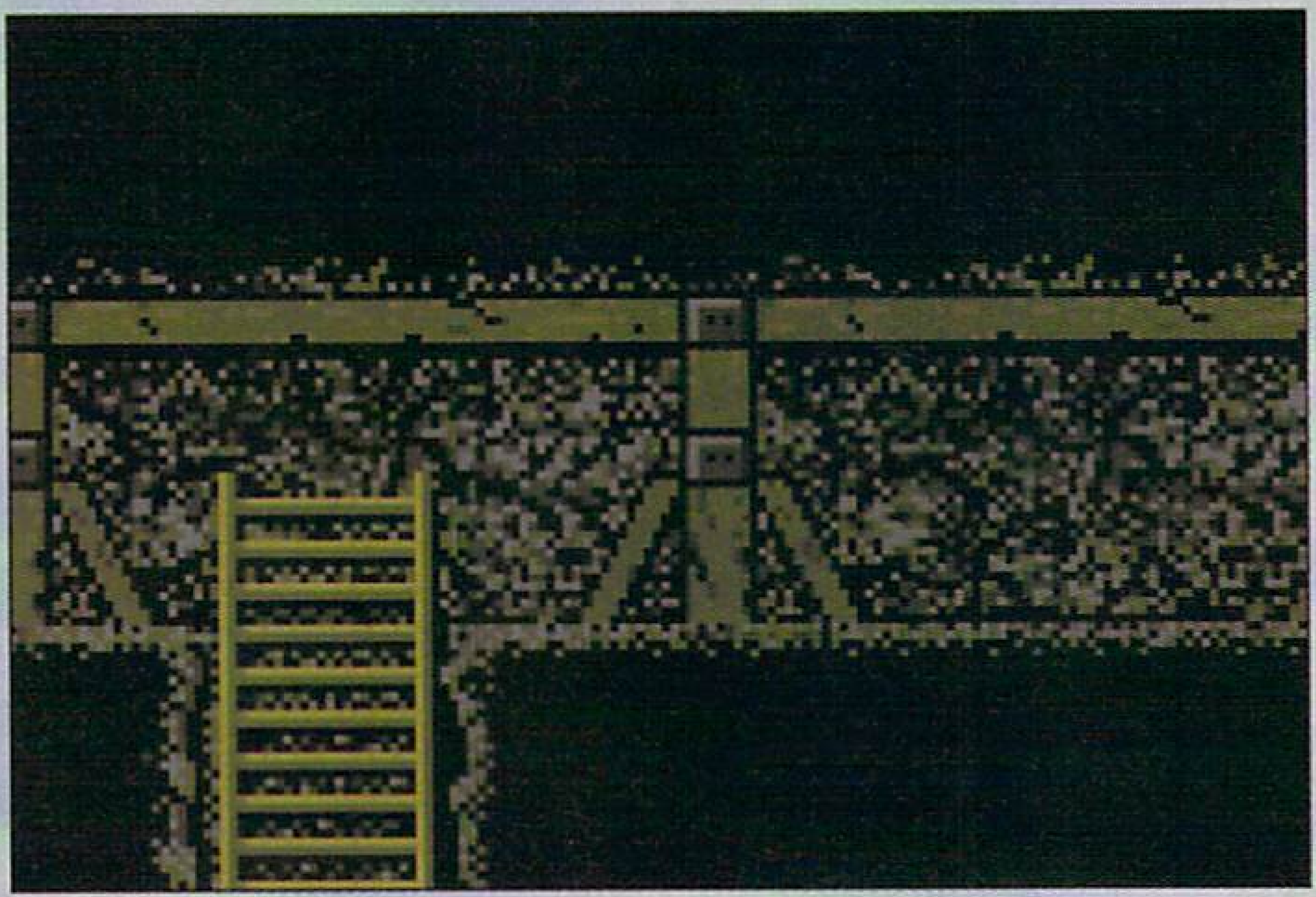


LOST DUTCHMAN'S MINE

In a cavern, in a canyon



When's opening time?



It's mine, all mine

ONCE upon a time there was a man. He was Dutch. He was also very forgetful. For example, he had a gold mine and he lost it.

Now the thing about this mine was that it was full of gold. Not completely full of course, there must have been enough space for the Dutchman to get in and out for instance.

Anyway, so there is gold enough to provide a ransom not only for the king but right down to the wife of his second cousin, but it's all lost down a hole somewhere.

Do you think the prospect of being killed by indians, bitten by snakes, caught in cave-ins, robbed by robbers or drunk by drinks in any way worried the average '49er? Neither do I.

LDM is a sort of graphic adventure-cum-financial strategy game. Control is both by mouse and by joystick; the mouse is used to select the icons while the joystick is used to control your prospector's movement and actions in particular scenes.

The game is based around a small town surrounded on four sides by desert and split by a dirt track connecting this backwater with territories to the northeast and the southwest. A solitary river winds its way through dusty valleys, providing a much-needed supply of fresh water and food.

Everything you need can be bought in the town, with the perennial provider that you actually have the money. The Mercantile store sells the tools and rations you need to run a successful mining operation and also firearms for protecting yourself.

A saloon is a good place to kip when it gets cold and can also be an unexpected source of income if you can get into a poker game with the stranger in the corner. Watch him though, he's good.

The town also features a bank to keep your hard (or sometimes easy) earned loot. Unfortunately banks are not necessarily as safe as houses, and the local bandits treat this particular branch as a kind of early cashpoint machine. They ride in, insert their guns into the cashiers nostrils and request to make a withdrawal. "Thnertainly, thir", says the cashier. "Ith that in thacks of fivethz or tenthz?"

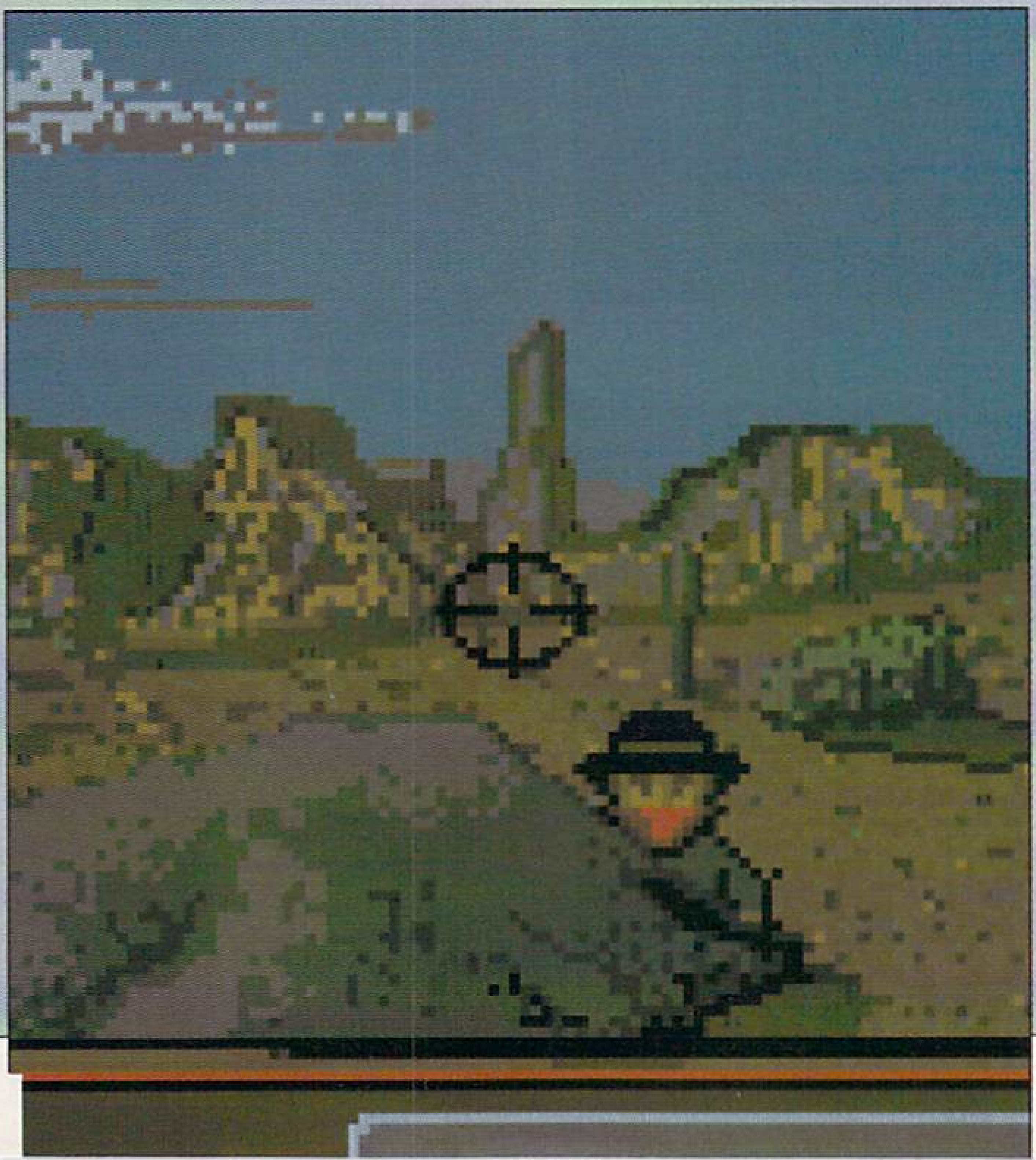
Of course, if you should run into these robbers in the dusty wastes you might be able to capture them and take them in for a huge reward. Easy money.

Panning for gold doesn't cover your costs unless you take some hooks and do some fishing as well. The real money is up in the mountains down abandoned mines.

The mountains are even more inaccessible and dangerous than the desert.

It requires a special kind of nutter to roam around the lower intestinal passages of structurally unsound mines on the off-chance of becoming spectacularly rich. Doesn't it?

A great degree of planning is needed if you are not to starve or dehydrate on your way to a mine. There is also the problem of carrying any ore back. The answer to most of these problems is a mule. They come in three models – Alice (Metro), Clara (Transit) and Betsy (Juggernaut).



Although most of the screen is fairly static, and the map view is terribly dull, the animations in the upper display are good. There is generally a fairly comic element in the illustrated sections.

Sound effects are minimal but well used, apart from the terrible noise when you go fishing.

This game may take some time to complete, and although packed with semi-random features it can get a little boring travelling backwards and forwards all the time.

But behind it all is an exceptional piece of coding. Many games players think that metal-bashing, super-scrolling mega-demos are real programming, but to me the ability to create a game with all these features *and* remain OS legal (well mostly) is real genius.

Lucinda Orr

Lost Dutchman's Mine
£19.95
Magnetic Scrolls

Aura	████████░░
Graphics	████████░░
Gameplay	████████░░
Value	████████░░

Overall – 81%

ROTOR

The cutting edge of game playing

THE recent glut of Thrust type games on the Amiga has cheered me up no end. If there is one type of game I particularly enjoy, it's the "rotate left, go right and pick things up" variety.

First I had Raider, then Dr Plummet's House of Flux, and the latest offering is named after a type of knife (rotor-blade, geddit?).

All these games feature a ship somewhere towards the middle of the screen, which spins and crashes under the laws of gravity into a landscape unless told otherwise.

In Raider the ship might have been criticised for being too small, in Rotor it might be said to be a bit on the large size. The movement as it rotates is so smooth that it seems to take forever to point in the opposite direction. Lovely stuff.

Graphically, the game is gorgeous. Rotor reputedly makes use of 32 colours in its scrolling backgrounds, and although these days my eyesight isn't good enough to enable me to sit down and count them all, the overall effect is stunning. Crystal clear and superbly realistic. I think it's fair to say that I like the graphics.

You might be disappointed initially, because when you first start playing, the graphics are various shades of green and the landscape is nothing more than a grid of squares. Ah, but this is only a simulation, à la Cosmic Pirate. The real treat is in store when you amass enough points to make it to one of the many missions displayed for you on your pocket computer.

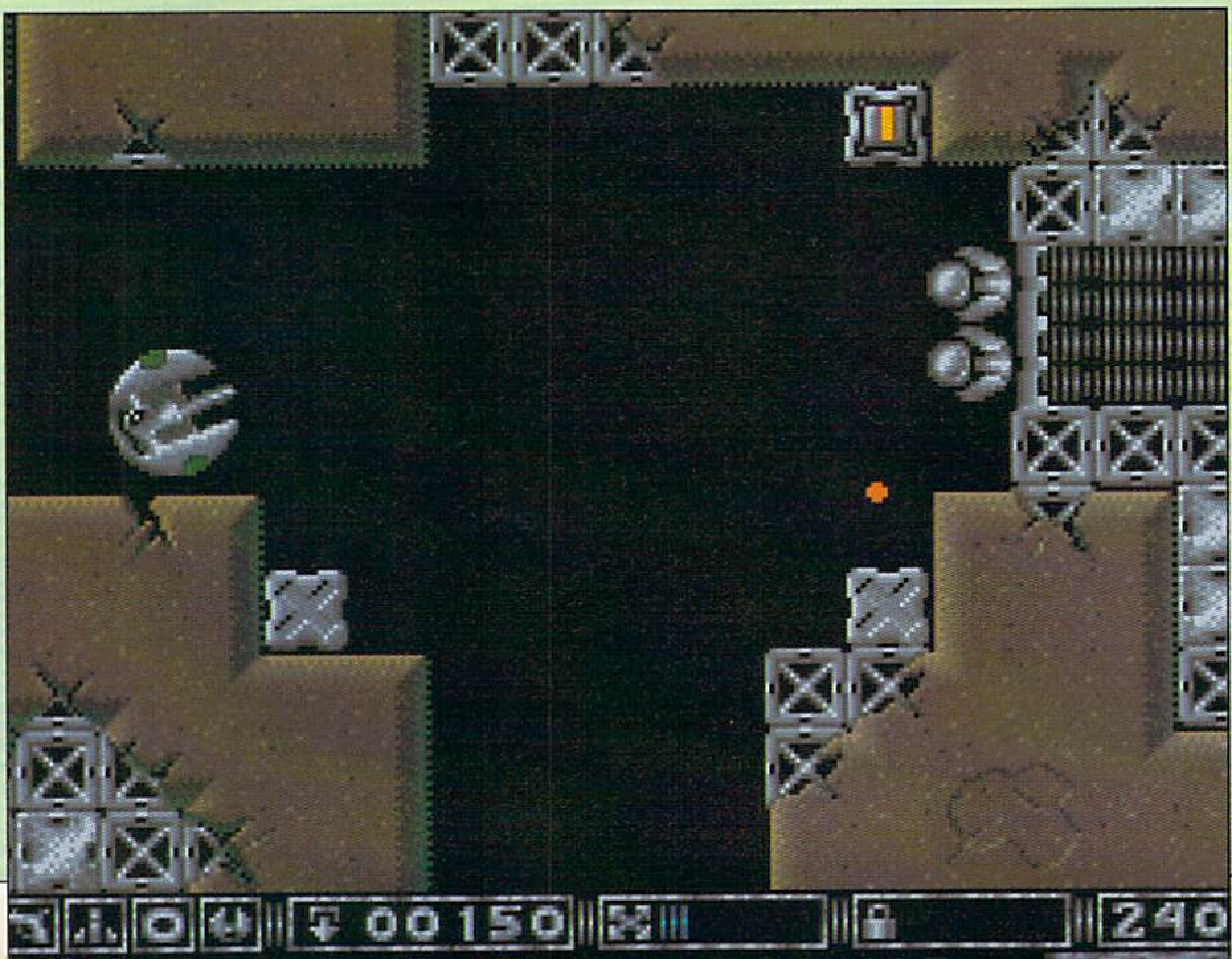


Five hundred points for the air freshener

And when you do... yummy, yummy, dig those graphics. Smooth scrolling. Wonderful stuff. Love it.

And the music! Freaky weirdo vibes, a sort of cross between Tangerine Dream and Vangelis. I could listen to it all day. It makes a welcome change to the bland electropop oozing from the 90 per cent of other Amiga games. Everyone in the office made some sort of comment about it. I look forward to the soundtrack album coming out on compact disc.


Oh no! I've broken my Lou Reed album!



I think we can assume I liked the sounds, too.

Gameplay? Well, you can take it as read that I liked *that*. Perhaps a tad confusing on the picking up and transforming side of things, and maybe trying to find the final escape coordinates might have been better implemented, but otherwise perfect. Or very close, anyway.

On the left of the display a control panel can be toggled on and off to give a miniature radar map with lots of numbers, coordinates and other technical looking information. Being able to switch it on and off is a wonderful way to give the player a sense of being in control and actually piloting a space ship.

You can improve your ship by shooting the containers scattered around the planets you are exploring and then collecting the energy pearls contained within.

Power can be transformed into various extra bolt-on goodies to aid rotation speed, improve armour strength and provide all sorts of extra weapons.

Unfortunately I have to qualify the almost perfect gameplay score with the old reviewing chestnut – "all right if you like this sort of thing" – because it appears that for some reason not everyone appreciates this type of game.

You need patience to explore all the landscapes, steady hands to control the ship and lots of free time to sit down and play.

John Kennedy

Rotor
£19.99
Arcana

Sound
Graphics
Gameplay
Value

Overall – 96%

RISK

How are your plans going for world domination?

SOME games are timeless. They seem just as relevant today as they did when they were invented. They are re-incarnated many times, changing only slightly to keep pace with the world.

None of them survive so complete and unaltered as a strategy game. Few strategy games have survived as complete and unaltered as Risk.

From its first inception on a flimsy board with garishly painted wooden blocks, through two plastic evolutions and a change of manufacturer, Risk makes it to the computer generation.

On that long path, has it changed? Have locations been renamed to remain contemporary? Have the hussars which appeared on a third of the game cards been turned into main-battle tanks? No. Then all is good.

The brief in Risk is fairly simple. You are a general in command of an army. From your allotted territory you must forge an empire – I thought I was a general, not a blacksmith – over the 42 territories of five continents of the habitable globe, destroying all who stand in your way.

Extra armies are gained for the possession of complete continents and the number of territories owned. Further reinforcements are obtained by cashing in a set of three cards which fall into a certain pattern.

You get a card at the end of every turn, provided you have managed to successfully invade at least one territory.

Adjacent territories may be attacked at any time during the player's turn, provided he has sufficient manpower. No country can be left defenceless.

In order not to deviate from the feel of the board game the offensive and defensive actions are still carried out by dice throws.

The computer throws the dice of course, just in case of accidents. Offensive players (sounds like Jeff) can use up to three dice while defenders may only use up to two, but their's are worth more in the event of a tie.

Combat involves the sort of mathematical luck which can never easily be predicted. There is always a battle worth fighting, a risk worth taking to add glory to the cause and land to the empire.

A definitive strategy for world domination has yet to be uncovered. Everything depends to a greater or lesser extent on luck. The odds can be narrowed down in your favour but in the end it's all down to how much you risk.

An excellent simulation which misses little from the original board game. Computer opponents are worthy but occasionally erratic. For real competition, play against your friends.

Lucinda Orr



Well, they started it



Some day all this will be yours

Risk
£19.95
Leisure Genius

Sound	
Graphics	
Gameplay	
Value	

Overall – 84%



This is a bit of an unforeseen strategy

RENAISSANCE

Plus ça change, plus c'est la même chose

GATHER round your Uncle John children, and I'll tell you a story. Are you sitting comfortably? Good, then I'll begin.

A long time ago, back when we had an ozone layer and rain forests, some kindly Japanese gentlemen took a break from killing whales and invented video games.

Hmm? What was that? My hearing isn't so good these days, my little friends. What were whales? Ahh, well you see whales were mighty sea creatures that were made extinct. They were very gentle and intelligent animals, their only fault being that they were too easy to catch.

What was I talking about? Oh yes, video games. Yes, children, these games were once very popular among young ones like yourselves. Push my chair over to my old computer and I'll show you, with this disc called Renaissance. Watch as it loads, children. Yes, it does take some time doesn't it. Time for some cocoa I should think. Thank you for asking.

In chronological order, the games we have here are called Invaders, Asteroids, Galaxians and Centipede. Except that they have all been given new non-copyright infringing names. Seems strange that Impressions can claim the games are faithful to the originals and yet remain afraid to keep the names. Would anyone really mind after all these years? Probably. In the old days they would have got away with it.

Pass me my pipe, please child. Thank you. Now on this disc we have two versions of each game – a classic version and a contemporary one. The classic versions keep the 1970s and early 1980s graphics and gameplay.

Ahh, what games they were... state of the art back then, believe it or not children. Unfortunately, I have seen better implementations on 8 bit computers, such as – my memory is going – I think they started with a B, ended with a C and had a B in the middle.

These versions also had a keyboard option, something sadly missing from Renaissance. Maybe it's just me, but I simply can't play Asteroids, er, I mean Rockstorm, with a joystick. Back in the old days joysticks were an expensive luxury. I even tried to build my own once, using a bolt and a rubber washer. Ah, those were the days...

What's that, child? What does contemporary mean? Hmm. I'm not quite sure. I think it means "the same game but with grey and orange graphics". Oh, and the backdrops have changed too. The instructions say the contemporary versions have more features, but they only seem to make the classic games look all the better.

Back in old money, a game such as this cost about 20 British pounds. Since there are eight games in total, this means each game costs, let me see, two-and-a-half pounds each. That's strange, that's about how much a public domain game costs. Just one of those things, I suppose.

Oh dear, my eyesight is fading.

Bring me back to my bed, young ones, it's time for my mid-afternoon nap. Yes, you can play on with the games. They are strangely addictive, aren't they? And that four-player option means you can all take turns, without fighting.

It is certainly nice to see those games again after all this time. And all on one disc, too. What nice people those chaps at Impressions were.

Old Uncle John



What sort of mushrooms are these? I could've sworn I just saw a giant cream puff

Renaissance £19.99 Impressions	
Sound	■■■■■■■□□□
Graphics	■■■■■■■□□□
Gameplay	■■■■■■■■■□
Value	■■■■■■■■■□
Overall – 81%	


Eat laser death, alien scumsuckers



New improved invaders



Breath taking

AQUANAUT

Deep trout action

GUILT-RIDDEN over all it had done to the planet in the previous centuries, humankind wised up. War was outlawed and everyone became as equal. The year of this revelation when the scales fell from the eyes? 1999.

I think this is a little optimistic myself, the Channel Tunnel probably won't be finished by then and Wogan will still be on the telly, but I suppose anything can happen.

Everything was peace and light. The people of Earth had even begun to clean up the mess they made. Unfortunately, as Earth once again began to resemble a green and pleasant land, it was being watched by envious, greedy eyes.

They belonged to a group of warlike alien baddies, chief of whom was a dude called Zeeke. They bombarded the Earth for a bit but were unable to break through the impenetrable force shield surrounding the planet.

Eventually they gave up and went away – all except one. Zeeke was a bit of a fanatic, so if you don't mind, he bided his time.

Finally he got his chance and slipped through an anomaly in the shield. Hiding somewhere in the ocean he began sending out messages to an unknown recipient somewhere on Earth.

Fortunately for everyone, in all the peace, light, harmony and disarmament the Secretary General of the United Nations, the familiar Hardy Haigh, had maintained an elite squad of fighting men for just such an emergency. You are Ric Flair and your mission is to save the world – a task more dangerous than opening the fridge.

Zeeke's ship only becomes visible when in contact with water, so the plan is to be dropped in the ocean and attack from below. This introduces a bit more peril.

The oceans are still a bit of a tip, full of toxic waste and old copies of ST User. In this almost alien

BLACK TIGER

Animal Magic

MAYBE it's not autumn but the *Amiga Computing* office is certainly filling up with old chestnuts. This type of game first hit the arcades about three years ago and died out as suddenly as it appeared.

The plot, like all the best ones, is fairly simple. You are a mad nutter with a morning star (that's the weapon, not the newspaper) and you must ply a path of blood and death through various catacombs, only pausing to rescue the odd good guy and buy more weapons.

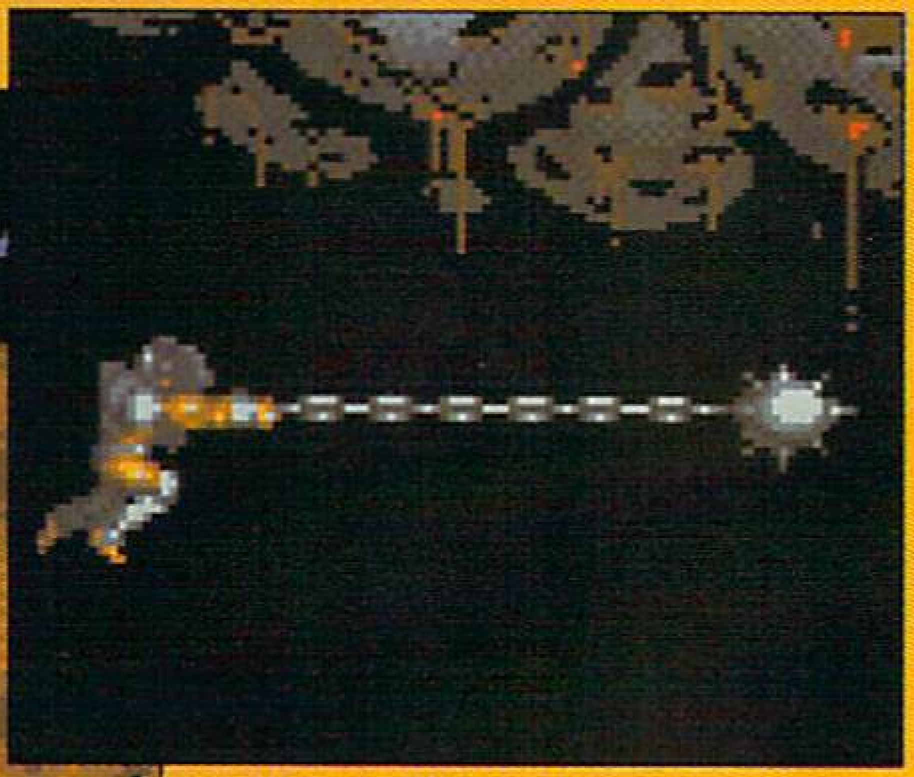
A cross between a beat-'em-up and a platform game, the graphics are certainly of arcade quality though the joystick response tends to be a little sloppy.

The game is playable enough. Nice graphics, nice sound, a bit old-headgear now, but a prime example of the genre in all its graphical splendour.

Green



Ever get the feeling...



The new Black and Decker head strimmer

Black Tiger
£19.95
US Gold

Sound
Graphics
Gameplay
Value

Overall – 68%

Aquanaut
£19.99
Fissionchips

Sound
Graphics
Gameplay
Value

Overall – 75%

environment the once friendly sharks and killer jellyfish have begun to get nasty. They are also breeding faster. Some sort of weapon seems to be in order.

Initially you have little more than a harpoon gun, but more equipment will be dropped for you to pick up at designated points on your travels.

This equipment may or may not be of any use to you since your enemy is an unknown quantity. All that is known is that the aliens are believed to be able to reproduce WW2 mines and depth charges, so watch out.

Most of the game takes the form of a sideways-scrolling alien blaster. In this respect it does not excel. The scrolling is jerky and although the backgrounds are varied, there just isn't that much to do at the beginning except stay out of the way.

Time limits between the drop points, where you must collect further supplies of oxygen, are too tight to allow much involved baddie-bashing, though there is enough time in certain spots for experimenting with the equipment you may have picked up.

Graphics are not incredibly impressive, but some of the animation sequences, notably those of the diver as he enters the water and when he changes direction, are very well done, giving a real illusion of depth to the screen.

By far the best feature of the game is the sound. A palpable sense of atmosphere is created. The effects of bubbles rising through the depths is a nice touch.

Overall, although Aquanaut is not dangerously persuasive, there is a lot to it and it should survive at least until you have saved up enough to buy another title.

Green



Have you seen Rod Steiger?

ITALIA '90

Happy to be on an island in the sun...

Italia '90
£4.99
Codemasters

Sound
Graphics
Gameplay
Value

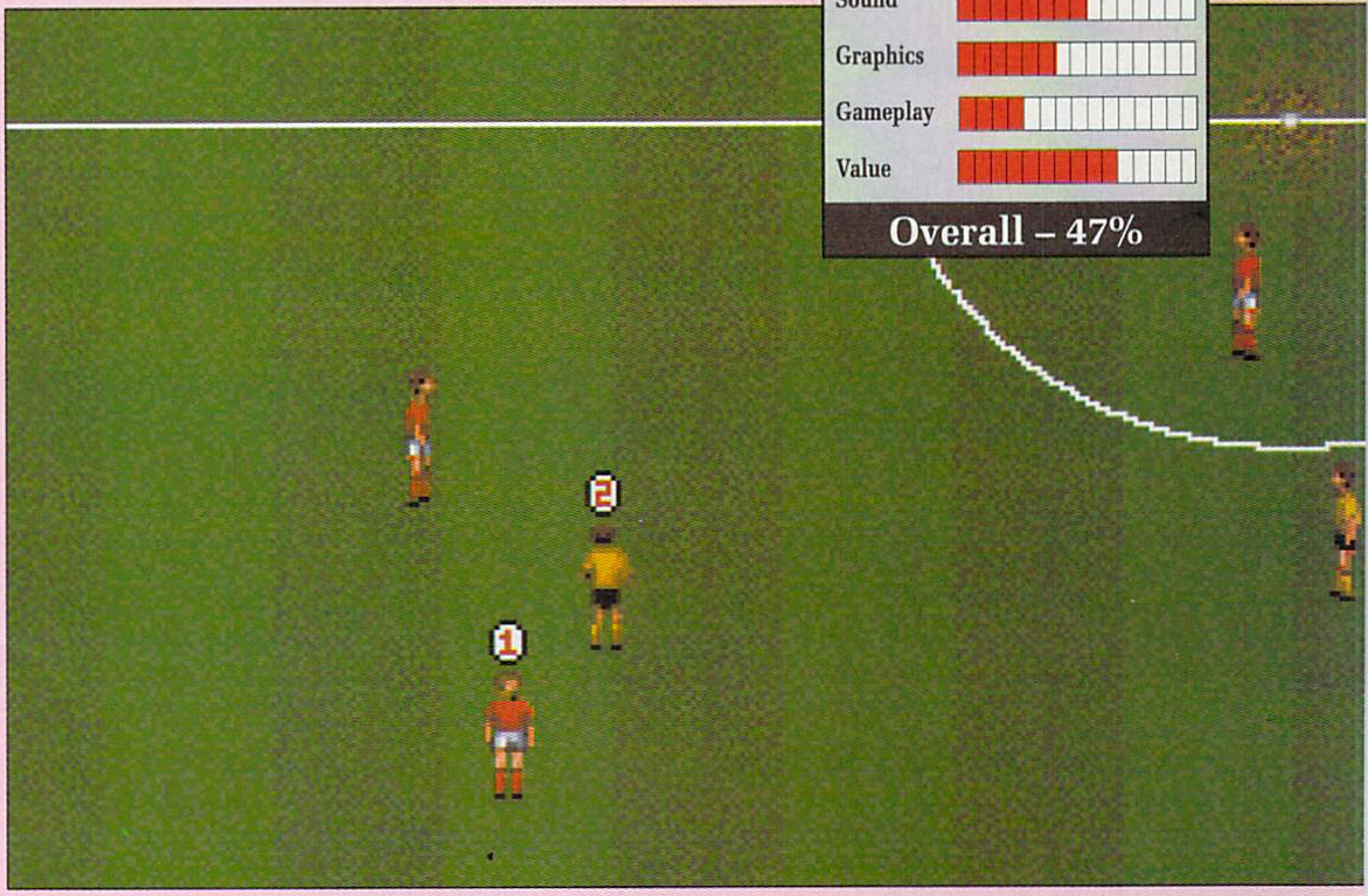
Overall – 47%

INSTEAD of putting up a fight for the World Cup of World Cup games, Codemasters seems content to put in a stuck together job in the hope of catching some glory. Admittedly, for the money you are getting a lot of game, but when it's this bad that sort of thinking seems to be redundant.

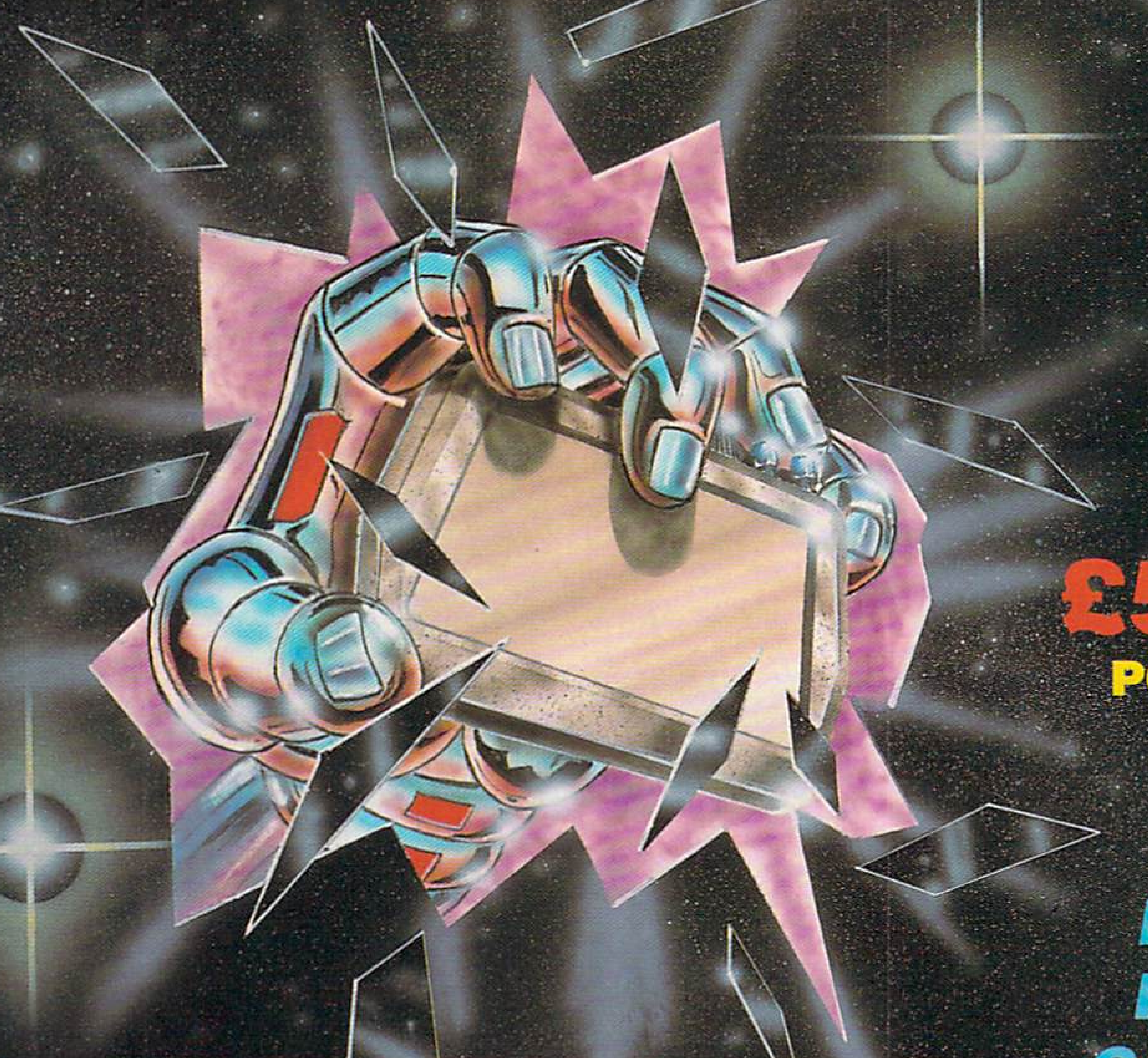
The game is split into two sections – the match and the training. This would be slightly good, even brilliant, if the training affected the skill and abilities of the players on the pitch, but it seems more a case of the Daley Thompsons.

About all that can be said for the match is that the graphics aren't that bad. Well, not horrendously bad anyway. Until they move that is. At least it has a four player mode, if you can find four people bored enough.

Green



Spot the ball



SOLDIER 2000

Send in the girls

So it has come to this; the horror hostage scene of the future. Who exactly caused it is immaterial. Was it the Milton Keynes Liberation Army, was it the Free F. W. De Klerk movement?

Who cares? Someone, somewhere, has captured a balding, fat businessman, so the crack anti-terrorist team is going in.

You control a squad of fit, highly-trained, ruthless, brutal, cute girlies. I know they are cute because I saw one in her bikini at the arming stage, where everything starts.

OK, so these girlies are pretty tough, but they're still human, so they can't carry everything. Heavy items will slow them down until they are so overladen they can't stand up. You will not be allowed to critically load your troops.

There are 14 different items to choose from, ranging from small single-shot hand guns through machine guns to grenade launchers and experimental pulse-lasers. Don't forget infra red sights if you want to know where you are when the lights go out. There is no time to fool about.

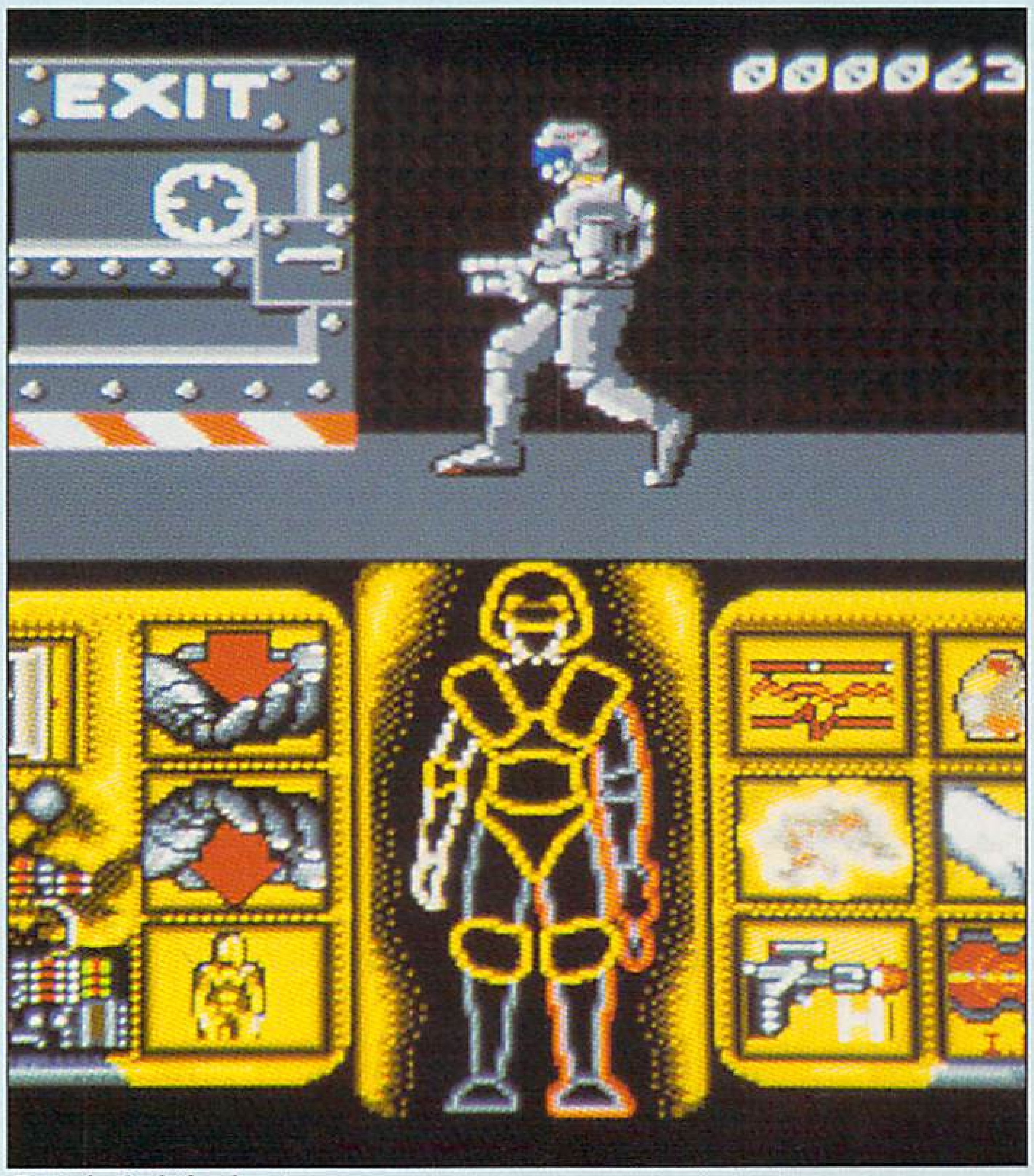
As you choose your equipment it will appear on your trooper at the left-hand side of the screen. Remember to get ammunition for your weapons – a grenade launcher isn't much good without grenades.

The scenario begins with a 2D representation of the player in a corridor. Baddies may attack from the left or right. Bullets, grenades and other goodies can be picked up and proximity mines can be dropped.

In the lower half of the screen a set of icons controls any actions other than left, right and fire. Picking up and dropping, activating IR goggles, going through doors and choosing your weapon are all icon controlled.

There is also a pictorial representation of your future trooper showing the damage to particular areas of her anatomy. When she is nearly dead a message will appear on the Heads Up Display.

Going through a door will take you into a whole new game – take a fresh grip on your bullet-proof mask. The viewpoint is now a kind of isometric 3D view with parallax scrolling. About three levels of background scroll as you move the girlie from side to side.



Don't be fooled – there's no way out

Take careful aim at the terrorists who appear from all directions. Mind you don't accidentally blow a hole in one of the chair-bound hostages by mistake.

Terrorists may be hiding virtually anywhere, some even pop up from trapdoors or abseil down ropes, Uzis blasting as they come.

A certain number of terrorists must be made to see the light – preferably through a third eye – before you can free a hostage.

If your soldier fails you can always send the next one in. This bit of the plot doesn't stand much scrutiny. Obviously you'd be able to combat the baddies better with three well-equipped killing machines fighting simultaneously rather than one at a time.

Apart from the arming stage and the parallax effects, the graphics are poor. They are actually quite grotesque in parts as terrorists desperately try to hang on to their innards, cast asunder by high velocity fire.

Once you get bored of the digitised squeals of terrorists being brutally dispatched, the sound begins to pall. With five levels of differing graphics and layouts there is a fair bit of gameplay, but when it comes down to it, Soldier 2000 is little more than a reaction tester.

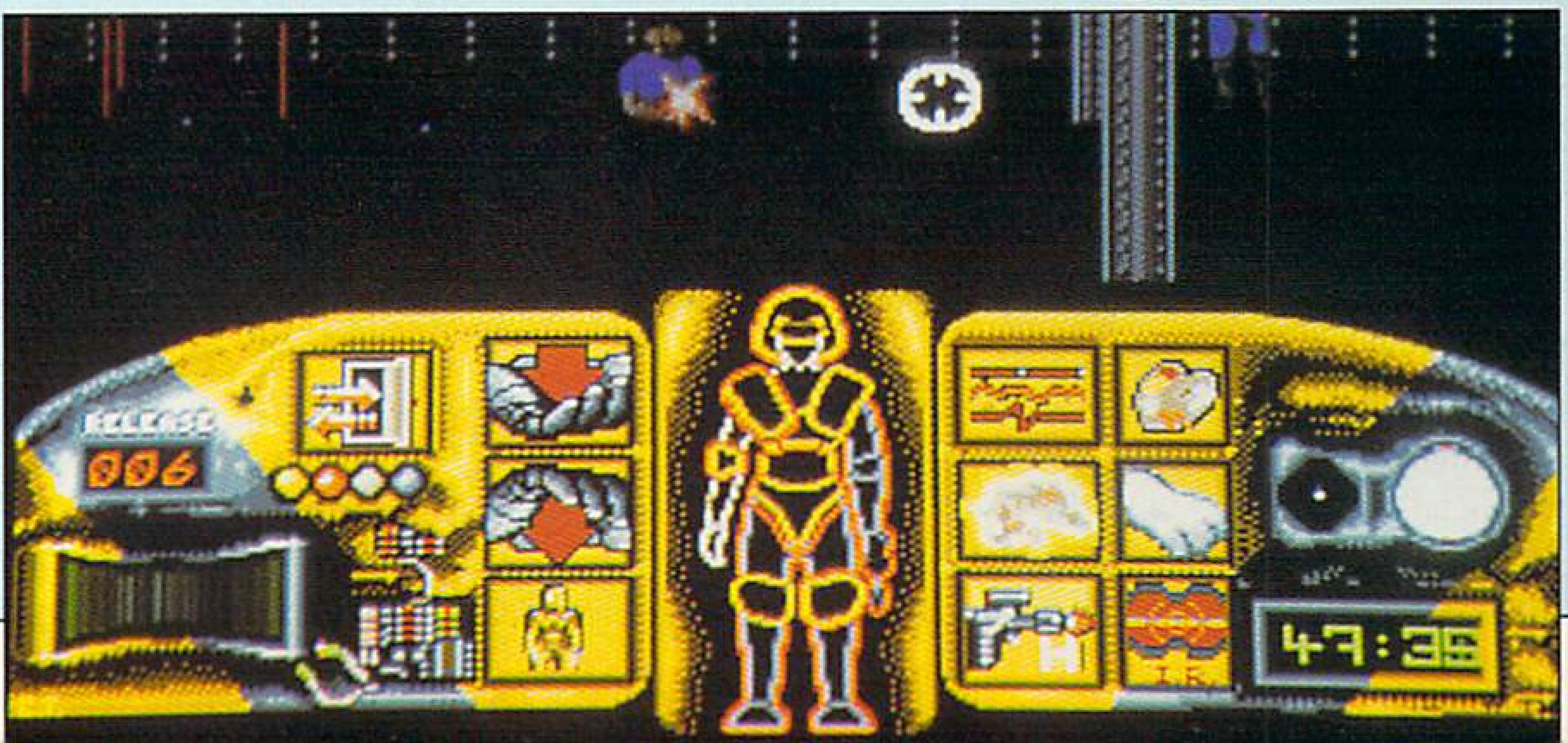
Mind you, so are quite a few of the most popular arcade games like Operation Wolf, Operation Thunderbolt, Operation Ad Nauseum... **Green**


What the well dressed marine is wearing this spring

Soldier 2000
£19.99
Artronic

Sound
Graphics
Gameplay
Value

Overall – 78%



Left a bit, right a bit...Fire!

FIRE

Burn baby burn



British rail unveils latest fare dodging counter measures

Fire £19.99 New Deal	
Sound	
Graphics	
Gameplay	
Value	
Overall – 52%	

TERRORISTS. Arn'cha sick of 'em? I mean, you've just got a little nation coming along quite nicely, when all of a sudden these blokes turn up and make a mess of the whole thing.

Or another scenario: Small country, heavily repressed populace. They have the cheek to start up a free market economy based on the plants of the Erythroxylaceae family.

Nothing wrong with that, nice little earner, but for the fact that extracts of the Erythroxylon plant just happen to make people go unhealthily happy and self-assured for a very short time, and then deeply unhappy. Yep, you guessed, it's cocaine I'm on about.

Hey, but these things are no big deal. I mean, given a helicopter gunship and lots of other stuff, a guy could get rid of all those problems and still be in time for his morning expresso.

But The Powers That Be have thought of that, and wouldn't mind if you got rid of some criminals hiding out at the North Cold, er, the North Pole, rescue some boat people, destroy some pinko commie subversive missiles, pledge allegiance, and tell some of those Middle Eastern types that, "Hey, we don't dig being shot at – that's *our* job !"

As you've probably twigged by now, Fire isn't about being New Age and mellow about humanity in general. You (who else?) pilot the helicopter gunship called Fire (must've taken weeks of work to think that name out) and you've got to show that the right side of an argument and the safer end of a gun are one and the same.

You scroll along, in a pleasantly Defenderesque manner, shooting everything that you can see. Isn't this a little uptight of you? Maybe you should be flying around giving flowers to people and saying that all this violence is very negative and all the guns should be melted down and poured back into Mother Earth and the Pentagon could be turned on its side and painted purple and there'd be dancing and poetry and general being together. C'mon people, sing May The Circle Remain Unbroken!

On the other hand, there's always the option of keeping doing what you're doing, chilling out is not an option. You could admire the scenery (it's very bright) and then defoliate it and burn the rest down.

You could watch the other helicopters as they plummet groundwards like a machina whose deus is definitely ex. Look at the little village huts. Don't they look lovely in the afterglow of an evening's raid?

Fire is one of those deeply annoying games that doesn't let up the action or the noise all the time it is loaded. It starts with the obligatory (awful) French Guitar musick. It then goes on to a rather nasty helicopter taking off from an aircraft carrier bit, and then to the game itself. Once the game's over (very quickly, you only get one set of shields) it's back to the aircraft carrier bit.

To be fair, there are worse games than Fire. There aren't many, though.

Stewart C. Russell

HUNTER KILLER

Run silent, run cheap

Hunter Killer £4.99 16 Blitz	
Sound	
Graphics	
Gameplay	
Value	
Overall – 78%	

DIVE! DIVE! DIVE! said the marketing men, and sure enough the price of Amiga software has plummeted to the depths of budgetdom, this time with a submarine simulator.

Squeezed on to the disc are 14 missions, all based around the area of Pearl Harbour circa 1942. Your command is a Gato class US submarine, armed with 10 torpedo tubes and a deck gun. This makes it a very small craft by today's standards, with a top speed of about 16 knots and maximum diving depth of 200 feet.

Now that we are no longer paying the price which traditionally was put down to development costs, what sort of game are we left with?

Graphics? Naw, not much in the way of those I'm afraid. Mostly waves and charts and grey blobs which are supposed to look like Japanese frigates.

The information dials around the edges of the screen are hardly state of the art, and the deck and periscope views are disappointing.

Sound? There is not a lot in that department either. The engines churn away, the explosions explode and the siren does a bit of whooping whenever you dive or surface. No tunes, no speech. Nothing fancy.

Historical accuracy? Unfortunately, as a simulation Hunter Killer leaves quite a lot to be desired. The mechanics of the submarine are so simplified as to be laughable, and in some places details are downright wrong.

So what makes me like it so much? Well, there are two reasons. The first boils down to the fact that I am a miser and Hunter Killer costs one shiny new pence less than a five pound note. Selling Amiga software at realistic prices is quite a new concept and not something which the software houses have had much experience with.

My second reason for liking the game hinges on the fact that I have always enjoyed sub games, ever since I first played that classic black and white arcade one, Depth Charge, all those years ago.

Ah, those were the days – there was something ever so satisfying in seeing the bubble tracks from your torpedoes vanishing into the distance, shortly followed by the red flash as they detonated against the hull of some huge enemy cruiser.

Hunter Killer allows me to do all this, with the extra freedom of patrolling the Pacific and the ability to surface right in the middle of a Japanese convoy, tubes flooded and ready to fire. Bliss.

With multiple missions, day or night scenarios and several skill levels, Hunter Killer presents a worthwhile challenge at a remarkable price.

Suddenly I find I'd rather play this rather lo-tech game in preference to the latest scrolling shoot-'em-ups. Perhaps I'm getting old.

John Kennedy

TYPHOON THOMPSON

Faster than a speeding fillet

Typhoon Thompson £19.99 Broderbund	
Sound	
Graphics	
Gameplay	
Value	
Overall – 72%	

OH great, a sailing game. I just *love* sailing games (says he with just a hint of sarcasm). But what's this on the back of the box? "You've heard it all before – amazing graphics, stunning 3D effects..."

Well they're right there, I certainly have heard it all before. Several times. Several times today, in fact. And it's still early.

Ah, but perhaps this isn't about sailing. And perhaps the blurb on the back is actually telling the truth. What makes me suspect this? Could it be the rather excellent opening animations and the cutesy tune? Yes, I think it could.

Well I never, perhaps I'm going to enjoy this game after all.

Like all the best games, Typhoon Thompson's plot is minimal, and what little there is doesn't make sense. From what I can discover, TT must save the day by rescuing a baby abducted by some water sprites.

The mysterious Spirit Guardians will aid you in your quest, if you in turn help them join the local freemasons by collecting various objects, such as daggers, hammers and balloons.

They give you four Jet Sleds in which to explore the ocean planet and an extra life for every masonic item you collect. The mouse-driven sleds are of the highly manœuverable variety, which for a change doesn't mean darn difficult to control but, instead, quite easy and fun to play with.

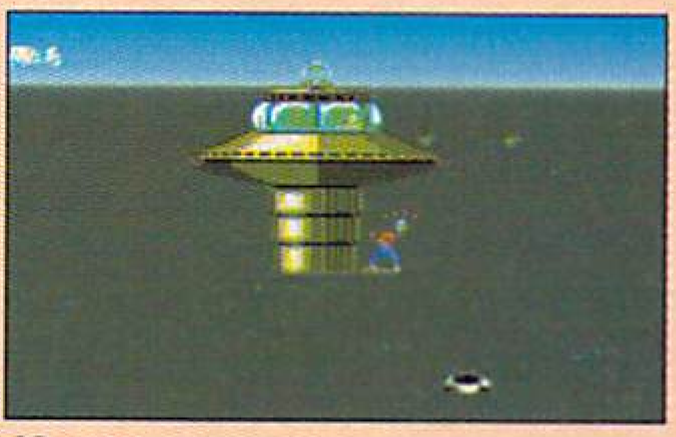
So off you set from the home island toward the first island village. The village consists of seven islands, each containing a number of flyers.

The flyers come in several brands, each with distinguishing characteristics and weapons. They are the Bad Guys, and will quite happily do something nasty to you, whether it's trapping you in a bubble, making your sled go purple and explode, or just bumping you off into the sea.



Look out, your head's on fire

You get your own back on the flyers by shooting them with the weapons supplied by the guardians, nice chaps. Once the flyers have been hit, the occupants – the sprites – are thrown clear of the wreckage and splash around stunned in the water.



No way

No matter how many times you stun the them, the sprites can't be destroyed and must always be collected. Must be hard wear sprites.

Once all the island occupants have been gathered up you are presented with the fabulous treasure (a balloon) and start on the next island. Each island gets trickier, with more and more sprites released from the even more abundant flyers. By the time you have reached the third of the four islands, the number of creatures flailing around in the ocean slows things down a trifle. Not enough to interfere with the gameplay, mind you.

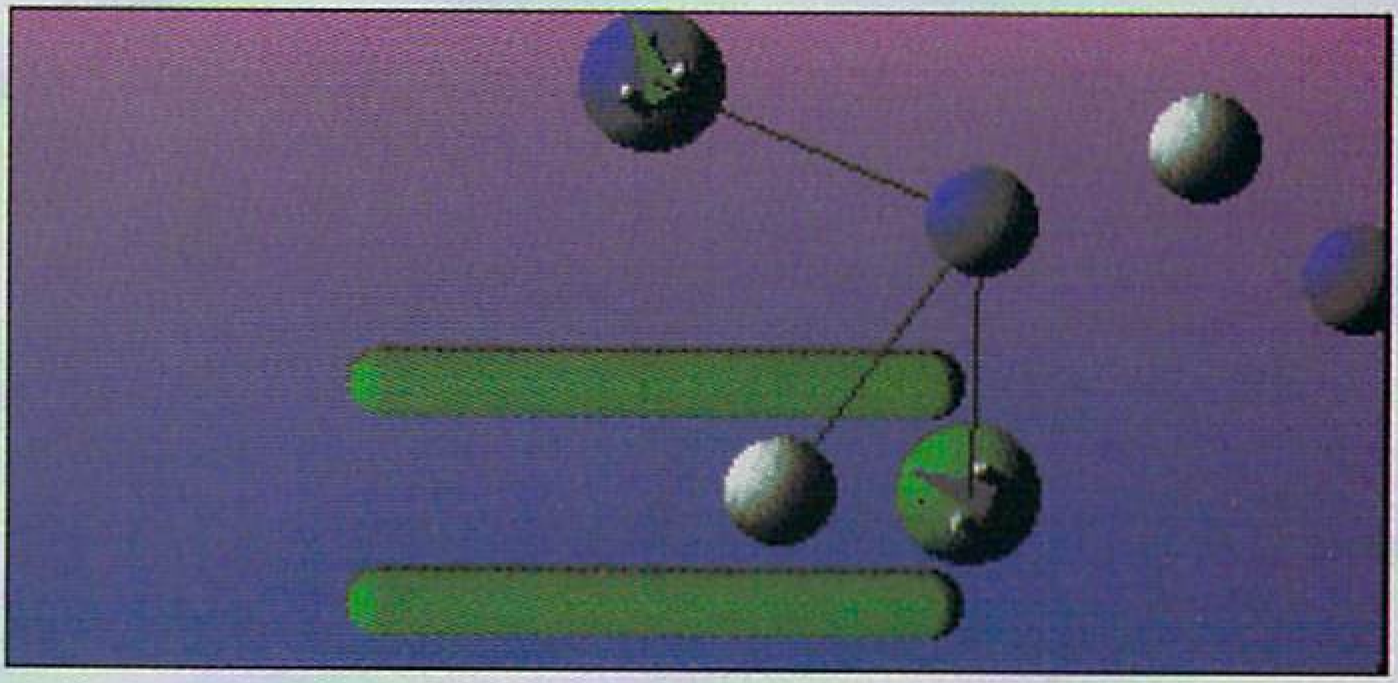
Sound is disappointing. Effects are a little thin at times, rather reminiscent of the bad old days of AY sound chips (the one the ST uses).

The animation, however, is very well executed, humorous and fun to watch. Clearly a lot of effort was spent here. At the expense of the gameplay? No, I don't think so. The plot is simple, but that is part of the game: Simple and addictive.

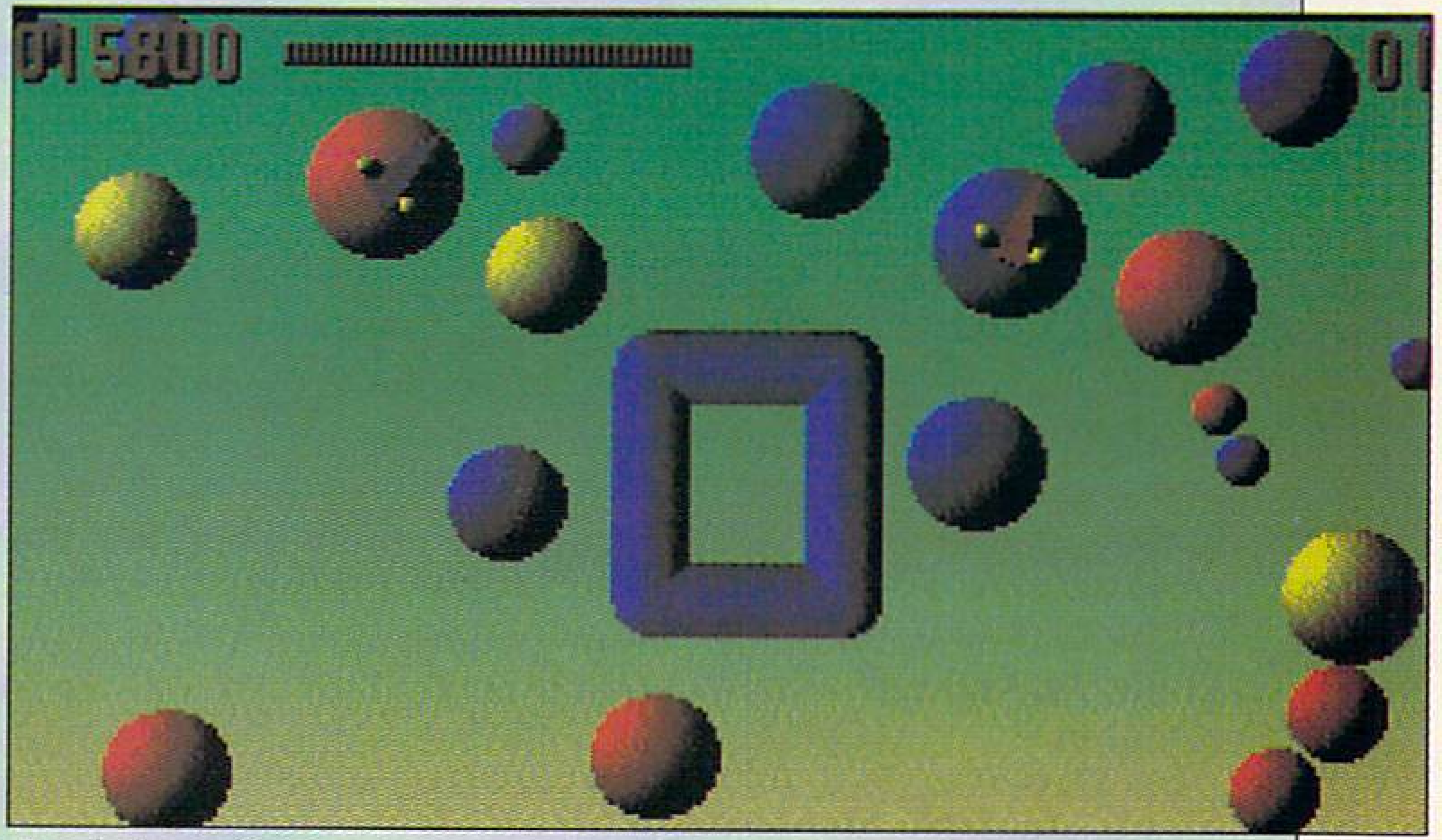
John Kennedy

E-MOTION

Feelings, nothing more than feelings...



Pull yourself together



Population explosion

SOME people spend all day making huge amounts of money. Other people spend all day trying to work out how the first lot of people managed to make all that money. Still more people, I suspect, will shortly spend all day trying to knock a couple of brightly coloured balls together.

I make this astonishing claim because, you see, I have played E-Motion. The object of the game, though perhaps the term experience would be more apt, is to knock together similarly coloured balls while keeping them away from any differently coloured balls – a sort of spherical apartheid.

Simple, you might think. But the balls don't like each other – there are repulsive forces at work. And even more complicated, some of them are joined together by elastic ropes.

Your player, denoted by a sphere with things on top which makes it resemble an aerial view of a Clanger, must bounce off things and do stuff to bring them together.

After a period they will go critical and atomise, leaving a nasty mess, so watch out when they start vibrating horribly.

Every collision plays a note, so when the game gets busy it reminds me of my sister's early piano lessons. Excellent effects, like being trapped inside a Mellotron. If the backgrounds aren't in HAM then they're a fairly good imitation. Ray-traced graphics lend the game a weird and futuristic appearance.

Fifty levels of puzzles, each more cunning than the last. E-Motion is brought to you by Assembly Line, the development team which produced Pipe Mania, so it is used to these highly addictive thinking games. Mind you, the same team was also responsible for Xenon II...

Green

E-Motion £24.99 US Gold	
Sound	
Graphics	
Gameplay	
Value	
Overall – 81%	

SOCCER MANAGER PLUS

They think it's all over...

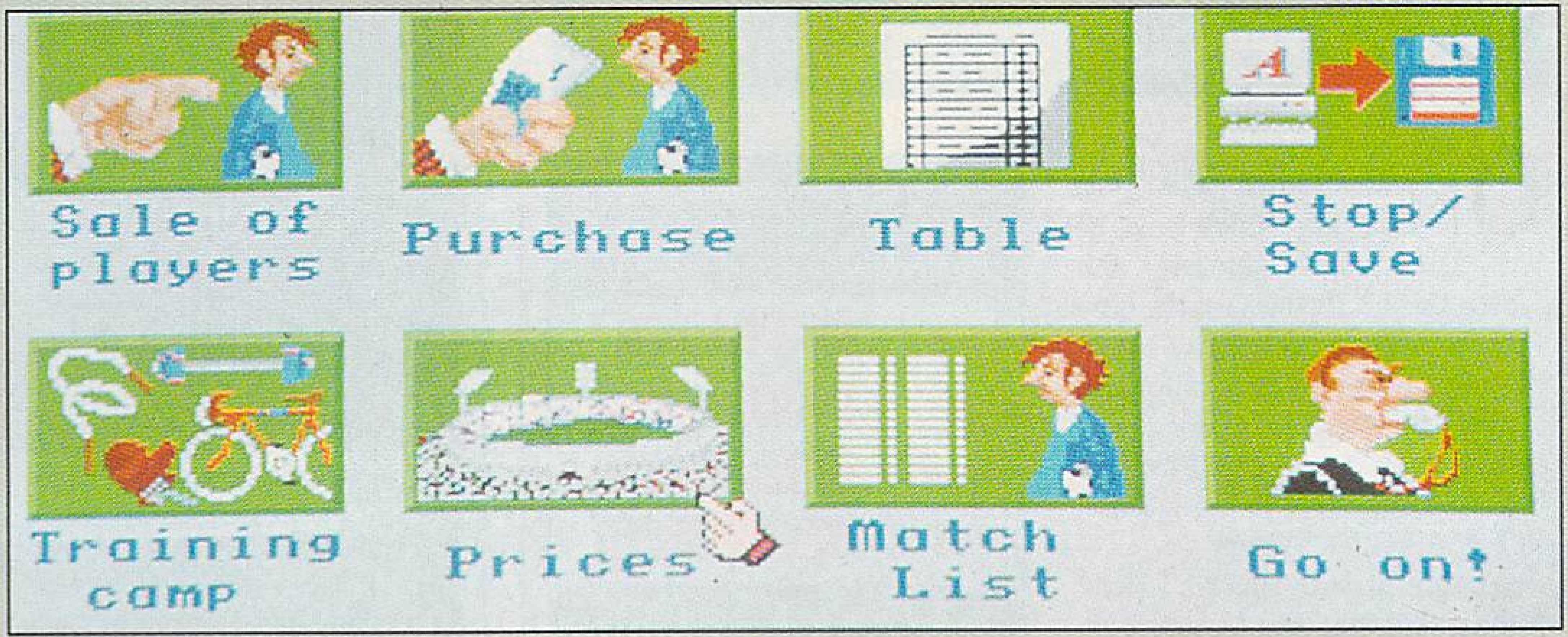
WELL, Brian, I don't really know why they made me manager of a second division football club. I didn't even know that there was an English league team going by the name of Green's Park Rangers (honest) but you might say it was cut out for me.

How do I rate my chances against the other 16 teams? Well, I've got a good set of lads who are all willing to give 110 per cent on the day. You can't say fairer than that.

Back in the dressing room I had a quick look over my players. I had a complete breakdown of the players skills – their ability in different positions, their fitness and most importantly their worth on the transfer market. Things weren't looking too good on the yacht front at that moment. Who was this Lineker guy anyway? And why did my goalie have such a good attack rating?

After hurrying back to my office I took out the manual I had been given. Unfortunately it didn't do me much good. The finer points of play were not mentioned and neither was the scoring system for the league table – PWDL it isn't.

I checked the fixtures list. Our first match was at home to Plymouth Argyl. Sure to be a crowd-puller I reckoned, so I made my first financial decision and bumped up the ticket prices. There was no fuss, it was as easy as moving a slider with the mouse pointer.



Where's the haircut option?

Selecting the team for the big match was equally as easy. I just put up a few markers to show the team which position to play in, because I could get them to play out of position if I was stupid or desperate enough. I decided on a classic 4-3-3 formation and chose the two subs.

I took position pitch side and decided to watch only the match highlights. It reminded me of playing Football Manager on my C64. From this distance the players looked exactly like hardware sprites and they certainly didn't seem too athletic. They just seemed to hit the ball backwards and forwards until it went into the net or out of my field of vision.

Although my team were playing in red and the opposition in purple, the crowd all seemed to have blue and white scarves. Must've got lost, I suppose. Their incessant chanting got on my nerves after a while. I'll never walk alone among that lot.

Come to half time we were down two-nil. How the goalie managed to pick up a yellow card I'll never know. I swapped in the subs and sent them out again. This time I told them to be as meek as lambs. I didn't want to risk any suspensions.

I couldn't face watching the match, so I just peeked at the scoreboard every now and then – it seemed to make the game go quicker. Full time score: 6-1.

"Well, Brian, what can I say? I believe that football is about two halves of 45 minutes and at the end of the day perhaps we were a little unlucky in that the other side scored more goals".

Right. Next time I would be ready. I packed the whole team off to an expensive training camp. This toned up their skills a bit and got them really fit.

A few dabblings on the transfer market got rid of my troublesome goalie and gained the team an excellent striker.

This time I told them to go all out for it. No more namby-pamby staying out of trouble, I upped their aggressiveness to four out of nine. Final score: 3-2 to us.

"Completely over the moon, Brian. I mean, we literally won this match in the dressing room. Now if you'll excuse me I have a man to see about a yacht..."

Green



Is that Maradona in midfield?

Soccer Manager Plus
£19.99
Starbyte

Sound
Graphics
Gameplay
Value

Overall – 67%

ESCAPE FROM SINGE'S CASTLE

Third time lucky?



HAVE they got it right this time? Is it third time lucky for the Don Bluth crew? Perhaps the two previous games, Dragon's Lair and Space Ace, were only practice runs. These were my fervent hopes as I unpacked the five Escape from Singe's Castle discs.

First impressions? Sigh. In common with the other Don Bluth creations, gameplay is yet again, how shall I put it, sparse. Second impressions were of embarrassment – the joystick wasn't plugged in.

Try again. Ah, the joystick certainly makes a difference. Admittedly, gameplay is the same type of "move left now, move right then" as before, but the presentation has been markedly improved.

Now we have three difficulty levels, choice of number of lives, random order of scenes, up to five saved game positions and stone me if it all doesn't multi-task as well! Plus the invaluable "helper" which will appear on-screen and drop subtle hints, such as when to wiggle in a certain direction.

The helper means you can advance quite far through the game before things start getting difficult. Combined with the difficulty levels, it means that both inexperienced gamers and hardened addicts will be able to get the skill level just right.

Yup, looks like this sequel to Dragon's Lair might have pushed the gameplay to the dizzy heights of "quite enjoyable". For any normal game, a playability rating such as this would be so-so, but with the phenomenal graphics and sound of a Don Bluth production, this suddenly means that the Amiga versions are suspiciously starting to look like some of the best software ever written.

Of course, it would be nice to see more flexibility – the labyrinth sequence shows this is theoretically possible, because as Dirk the Drongo flails around a maze in search of an exit, you have total control of the direction to take.

This sequence can be played almost indefinitely until you either find the way out or poor Dirk takes a wrong turn and crashes into a wall. If the rest of the game allowed as much expression of free will it would be breathtaking.

This must be the most techie-friendly game I have yet to see, because it will run with floppy drives, hard drives (any make, unlike the prequel) and as much extra memory as possible. Plus, it will run on a bare minimum, one drive, 512k system.

Sound and certain animation sequences can be skipped to allow the game to be shoe-horned into your particularly setup, or to speed things up slightly by reducing the number of loads.

Basically, the more hardware you have connected to your Amiga, the better the game gets.



As an added bonus, you can incorporate your original Dragon's Lair discs to form one staggeringly huge game. Now you can practice the levels in the original game which you never got past, and use the helper to provide vital clues.

If you sit down to play the entire combined epic, the random shuffling feature will produce one long, unique stunning performance.

Deciding the ratings for software like this is always an interesting experience. Immediately it gets 15 for graphics because, quite simply, they are brilliant, astounding and generally rather good.

Sound also gets a 15 because when Dirk walks up to a strange door he hums to himself and then gets attacked by a large monster; this sequence is one of funniest things I have ever seen on the Amiga. It totally cracked me up.

Gameplay is the tricky one. It is not perfect by a long way, but the overall ease of use has been improved a great deal. I think I'll be generous here, because at least it's getting better.

Value? Hmmm. That's where it

Escape from Singe's Castle
£44.95
Empire

Sound	
Graphics	
Gameplay	
Value	

Overall – 85%



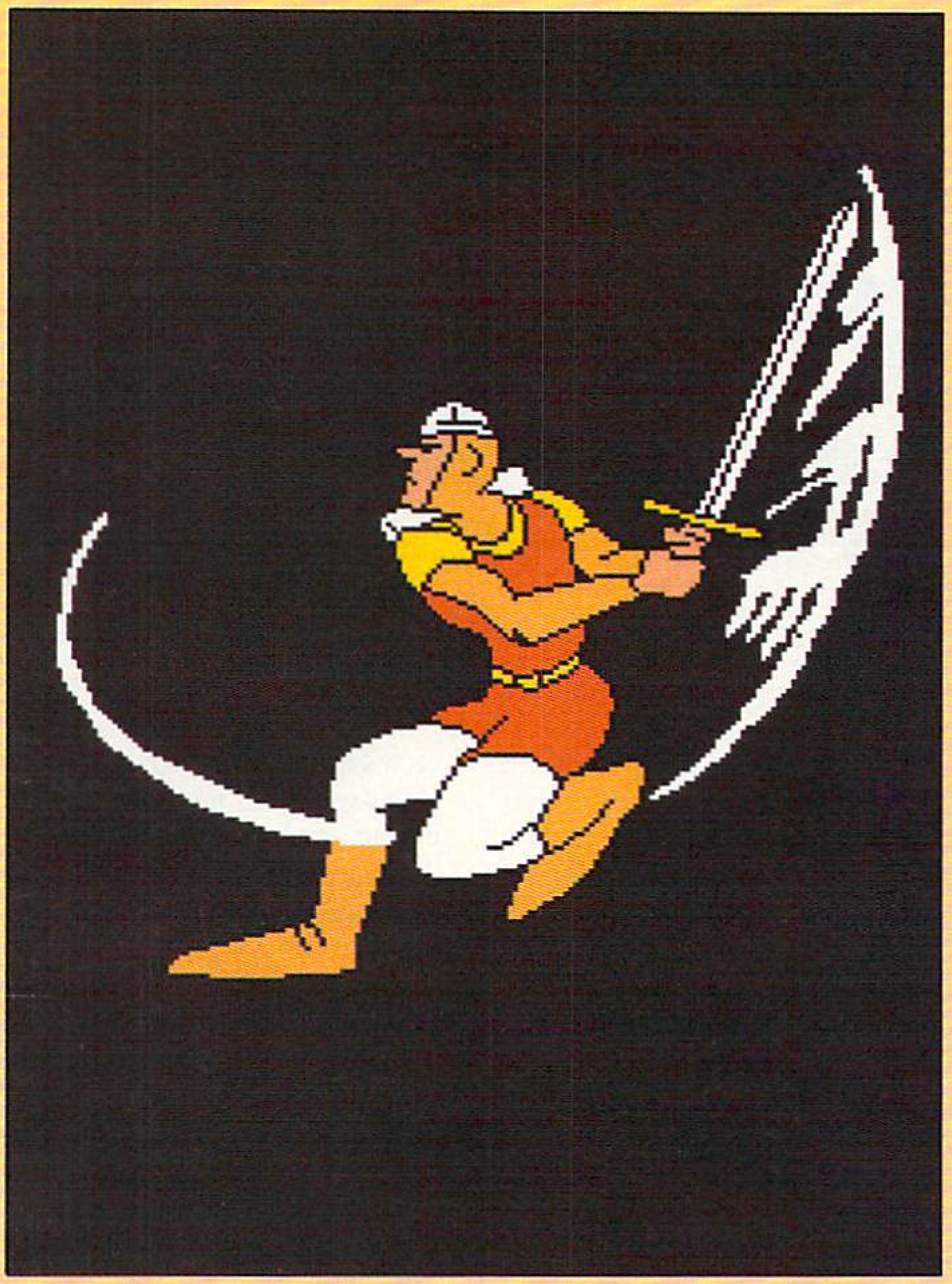
Guess who's coming to dinner? – Dirk meets the Goons

all falls down. The price is steep and will only encourage Singe's Castle to become the next number one pirated game, especially with the unprotected discs and relatively simple password system.

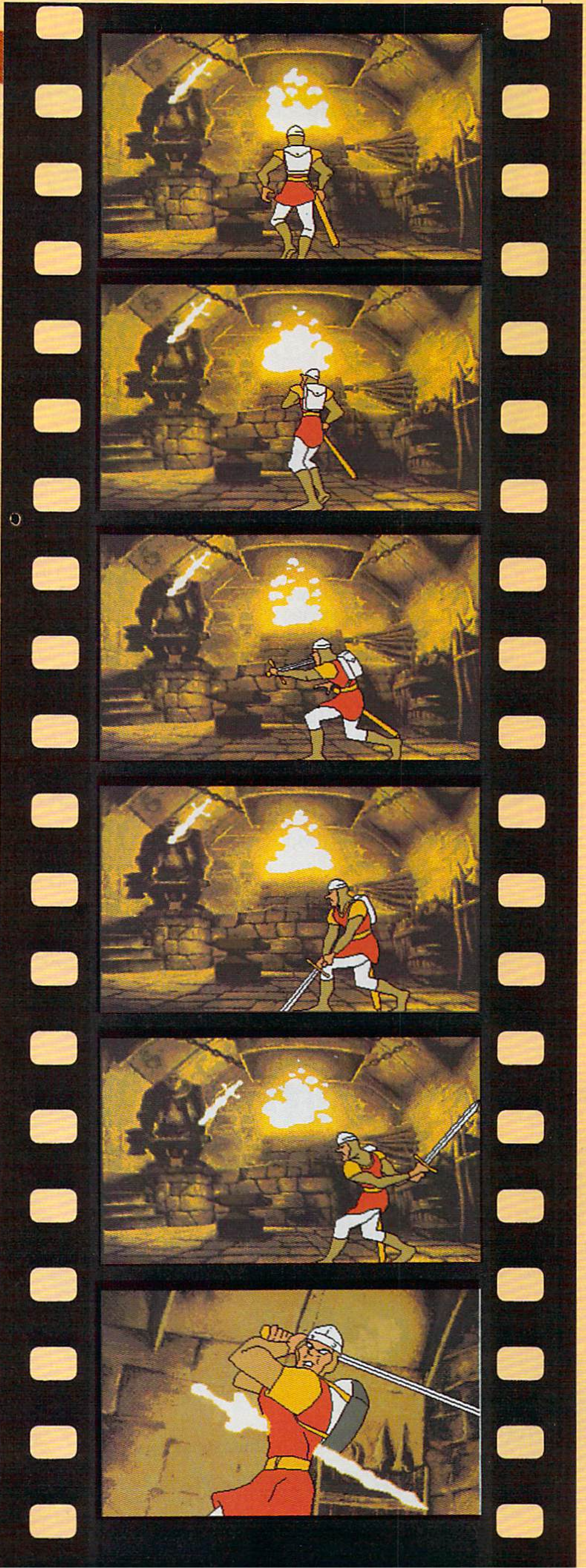
Make sure you see this game, it uses the Amiga in the way it was intended – to amaze.

John Kennedy



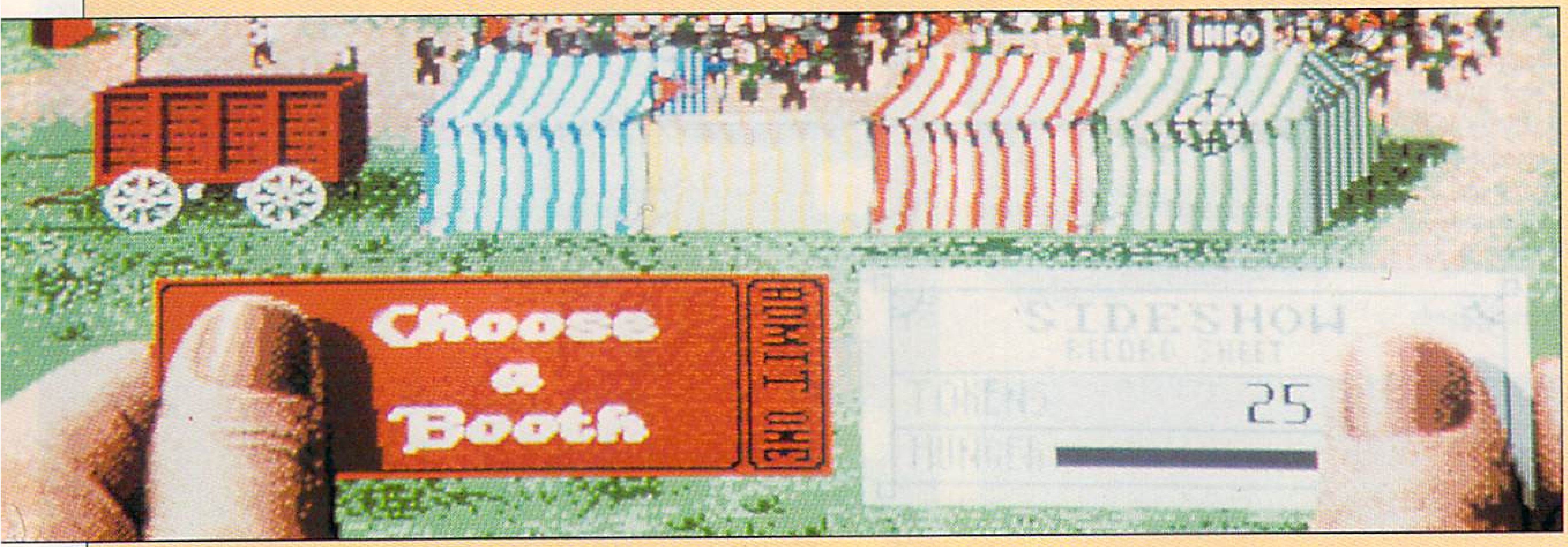






SIDESHOW

Oh what a circus, oh what a show



Looking around with deadly intent

APART from a few die-hards still touring the country, most of the great circuses are dead. They used to be the standard trip out for children's parties and the like – a spot of jelly and ice-cream before popping out to watch the clowns and the elephants.

Even in my youth, all those years ago, there were very few *big* circuses and the old tradition of the main tent being surrounded by sideshow attractions was all but extinct. Now you can catch up on what you've been missing with Sideshow from Actionware.

Actionware is well known for producing software that works with a lightgun. There was Capone, where you used a lightgun to shoot gangsters that popped up. Then there was POW, where you used a lightgun to shoot Germans that popped up. Not forgetting, of course, Creature, where you used a lightgun to shoot creatures that popped up.

So what can we look forward to from Sideshow? Clowns popping up? No. This is where Actionware seems to have deviated totally from its well used but always reliable plot line and actually introduced some new concepts.

And this is the plot. You have gone to the circus and bought a certain number of tokens for use at the sideshows. Each booth contains a different game and costs a different number of tokens. If you do really well at a booth you may win back more tokens than it cost you to play there in the first place. In this case you have "won" the booth.

Obviously if you keep doing this, not only are you going to become wealthy rather quickly, but the poor bloke running the booth is going to be suffering from a severe case of the Lawson's. Therefore you may only win a booth three times before it closes down.



Nice arrows!

So all you have to do is win three times at every game and go home with pockets full of tokens. Simple, eh? Well, firstly you haven't tried playing the games yet and secondly there is the not too small problem of your stomach.

After a period you will begin to get quite ravenous. In the event of a severe snack attack you will have to go home immediately, ending the game. However you can periodically quell the pangs by visiting the concession stall in the far corner of the showground. A few hot dogs and a bag of popcorn will keep you going for the show.

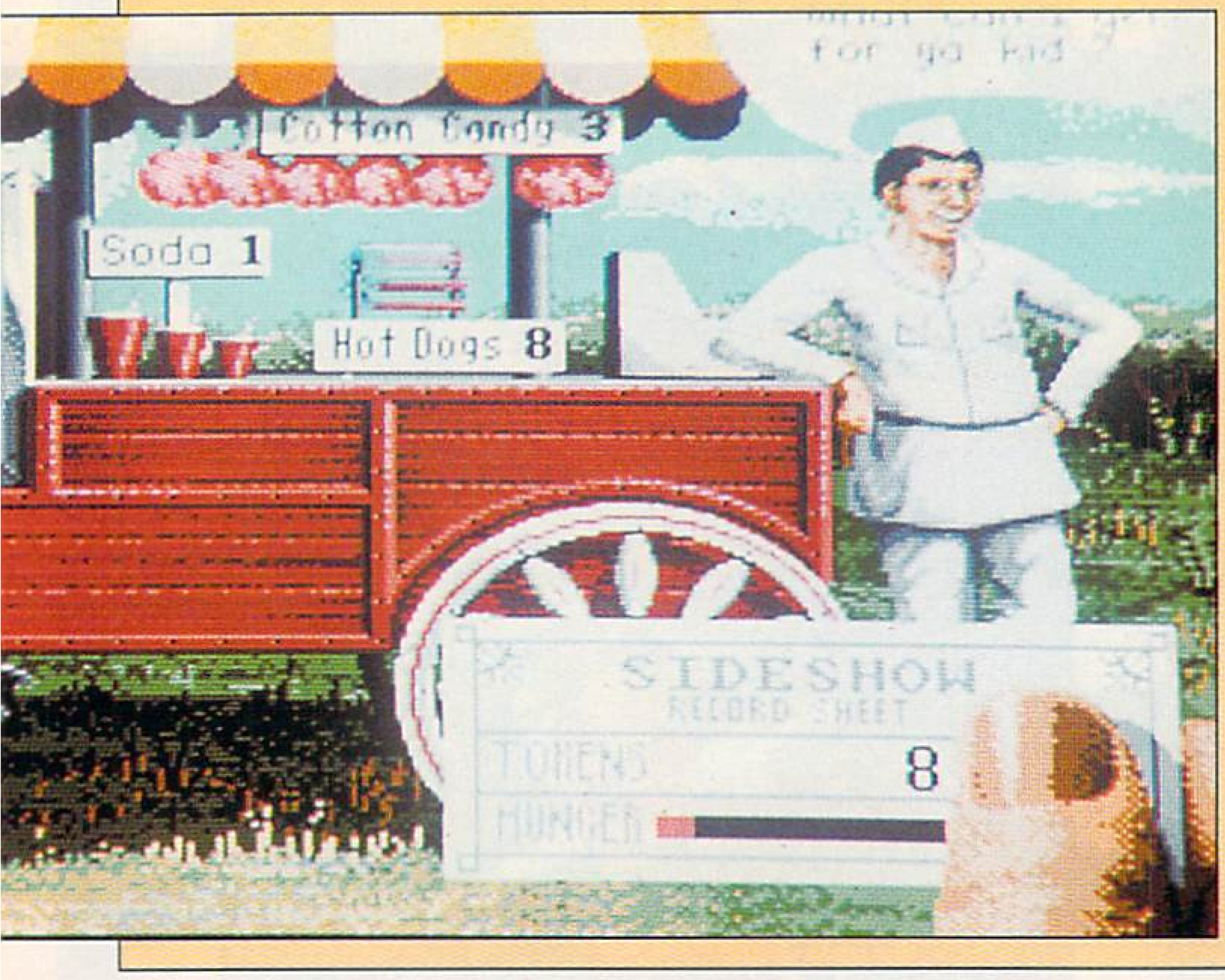
All the games, predictably, feature some sort of shooting. Shooting balloons, shooting balls, shooting ducks, though there is a little more intelligence to it than that. Mindless blasting will get you nowhere – intelligent blasting is what's required.

Some games require you to find a pattern in the objects you shoot, others simply require speed or accuracy. Whatever the speciality, each game is challenging in a different way. This not only makes it better value than some of Actionware's earlier titles but actually develops the strategy of the game.

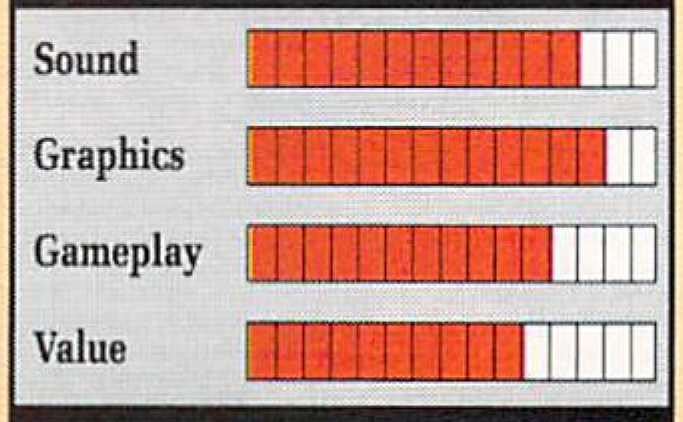
The graphics are excellent in places, yet fairly mediocre to pathetic in others. Good but not consistently brilliant. Sound effects and the odd animated sequence help to build up the atmosphere of the circus, as does the authentic bag of popcorn included with the game.

Admittedly Sideshow is really only tremendously wonderful if you have a lightgun, but still worth a look nevertheless. A high resolution mouse is recommended.

Green



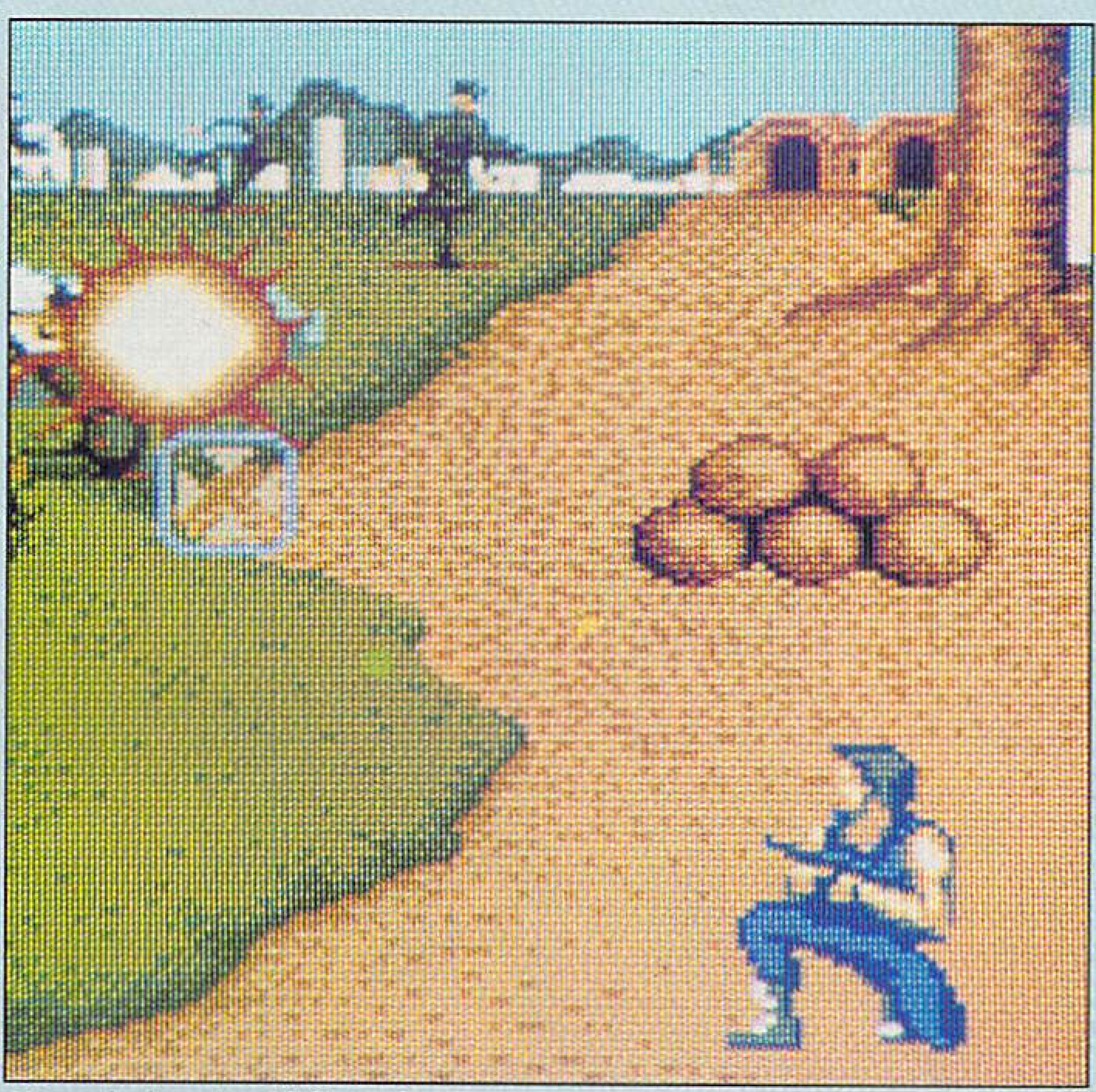
Sideshow
£24.95
Actionware



Overall – 78%

CABAL

The hundred years war



How to look cool and kill people

NOBODY said it was going to be easy, but on the other hand nobody said it was going to be quite as hard as this. You have been cut off deep behind enemy lines with little or no equipment. The battle now is for survival.

Interestingly, no mention is made of who you are fighting. Could be any frontier, any hemisphere: Nicaragua, Honduras, re-run invasions, death squad Salvador – one world and it's a battleground. Where is there a more just cause for fighting, where is there a better motto than "Fight or Die"?

Armed initially with only a single-shot repeater and an unlimited supply of ammo you will come face to face with enemy marines, tanks, frogmen, motorbikes, helicopters and planes.

The levels all look fairly similar, from a strategic point of view at least. There are usually one or two pieces of scenery hanging around in the foreground for the player – or players if you plugged in a second joystick and went for the two-player option – to cower and cringe behind. Beyond this are one or two structure like buildings and walls for the enemy to hide behind.

Moving the joystick left and right, up and down moves the aiming sight in the respective direction. Unfortunately it also moves your man – you can't aim far right while being on the left-hand of the screen.

This makes things more interesting. It is not enough just to be able to aim excellently, but you must also keep a careful eye on your own current position. Stray into enemy fire and it's Goodnight Vienna, Berlin, Moscow and Saigon.

The enemy will pop up, fairly predictably, have a few shots at you, take advantage of any natural cover and run off again. Dodge grenades, bullets and shells. If you move fast enough you can roll along the ground and miss everything.

Pull the joystick down quickly to throw a grenade. In my experience this is nearly always done by accident. Grenades are useful for dispatching the frequently-appearing tanks and the odd crowd of persistent attackers. They are fairly effective against buildings too – remember, it is important to destroy these quite rapidly so you can see what is going on.

Hitting some targets will release bonuses in the form of advanced weaponry or extra grenades, but you'll have to be quick.

Once you have killed a certain number of baddies you will progress to the next scene. There are four scenes to each level and each level ends with the customary superhuman bad thing that requires a high degree of manual dexterity and more than a modicum of blast power to get rid of.

Animation-wise there is nothing to get too excited over. The tanks are quite good but the rest wouldn't look too much out of place on an 8-bit machine. The colours chosen seem to be a little strange, nothing completely strange but I wouldn't want them doing my interior decorating.

The two-player option is interesting. It is one of the few games of this type where two people playing together will end up cooperating rather than competing.

Green

Cabal *£24.95* *Ocean*	
Sound	██████▌
Graphics	██████
Gameplay	██████▌
Value	███████
Overall – 68%	





Anyone want to play with my sparkler?



A LONG time ago, in an arcade far away, I came across the cult cutesy classic, Bubble Bobble. If ever there had been a more ridiculous set of heroes than a pair of bubble-spitting lizards, I had thankfully been spared them.

But the two saviours of bubblekind were a real hit. Girlies everywhere queued up in their lunch hours just to bounce on a few balloons.

It isn't over yet. The human race is to be further subjected to severe doses of cuteness. Bub and Bob have returned, looking slightly more human, in Rainbow Islands.

This time they are not out to save people from unspeakable danger or anything like that. They just want to get from one end of the picturesque archipelagos to the other. Selfish, or what?

There are seven islands in the chain, each dominated by some strange sub-species which are definitely not on friendly terms. Such adversaries include spiders, crows, tanks, bats, balls, spheres (no, I don't know what the difference is either), robots and dragons. So there you go. Looks like some form of weapon might come in handy.

Unfortunately B&B no longer have the ability to spit bubbles capable of supporting their own weight. Nowadays they have to make do with creating rainbows. I would have thought the ability to produce diffraction phenomena at will would have led to better career opportunities than this...?

Rainbows can, like the bubbles before them, be walked upon by our heroes. They can be used to incapacitate the foe or to collect objects. Jumping on a rainbow causes it to break – it's true, I've



Like a bridge over troubled water

RINGS OF MEDUSA

Stony-faced adventuring

EVERYBODY has an off day. You know the sort of thing – wake up in the morning and there's no milk for your shreddies, can't get to work because the trains are screwed up. But all this is as nothing to the problems facing Prince Cirion.

His father's bought it, so has the best magician in the kingdom. What's left of it, that is, because the rest has been overrun with demons, robbers, orcs, editors and other lower forms of life. Things are looking quite bad.

Commander in Chief of the invading chaotic forces is Medusa. I don't think she is any relation to the Prime-based 3D modelling package, but she seems to be just as temperamental.

The only hope of defeating her is to find five rings, the Rings of Medusa no less, and gather what the blurb describes as a "relatively huge" army, before putting her to the sword.

This is not quite so easy as popping into the first jewellers you come across. The rings could be anywhere in the kingdom and the kingdom is no longer a place you want to wander about unless you are being followed by a few thousand highly trained soldiers in your employ.



Hardly Nato HQ, but this is where you control your army

Now in order to get a decent army you need a large amount of money. I don't know what you reckon, but I don't think even the TSB would be prepared to lend you several million on the strength that you may or may not win back your kingdom. The local banks will be prepared to lend you a few grand to get started.

From there you can take up a number of careers to increase cash flow. In fact, the first thing I did when the bank gave me a loan was to go straight to the park, sign up 50 men, outfit them and then go back to the bank and rob it.

There are a number of slightly more honourable professions you might take up. Trading with ships or wagons, searching for and mining raw materials or gambling in the casinos, as well as outright banditry.

Actually, it all begins to remind me of Elite. I mean, obviously it is set in a different period and all that, but the basic components are the same.

All the options are icon driven. These are not the sort of icons that seem to represent anything but the sort of indistinct things that hang around on the bottom of the

Rings of Medusa
£19.95
Starbyte

Strategy
Graphics
Gameplay
Value

Overall – 85%

RAINBOW ISLANDS

It never rains, but it floods

seen it! – destroying or collecting anything below.

Of course, all this rainbow business isn't without its drawbacks. After a while the island will begin to sink. Whether this is to do with the greenhouse effect is not adequately explained.

Bub and Bob should stop using aerosols if they want to survive 'cos once the tide starts coming in it looks like North Wales in March.



And so our rainbow warriors progress, climbing to the top of the screen in each level, collecting bonus fruit on the way. Some of the objects to be found are a lot more useful than fruit. A shoe will give extra speed on the ground, while the potions will enable faster and longer rainbows.

Each island also contains a secret room, a bit like Bubble Bobble. The way to access these rooms remains secret but if you follow the same plan as in the prequel you won't go too far wrong.

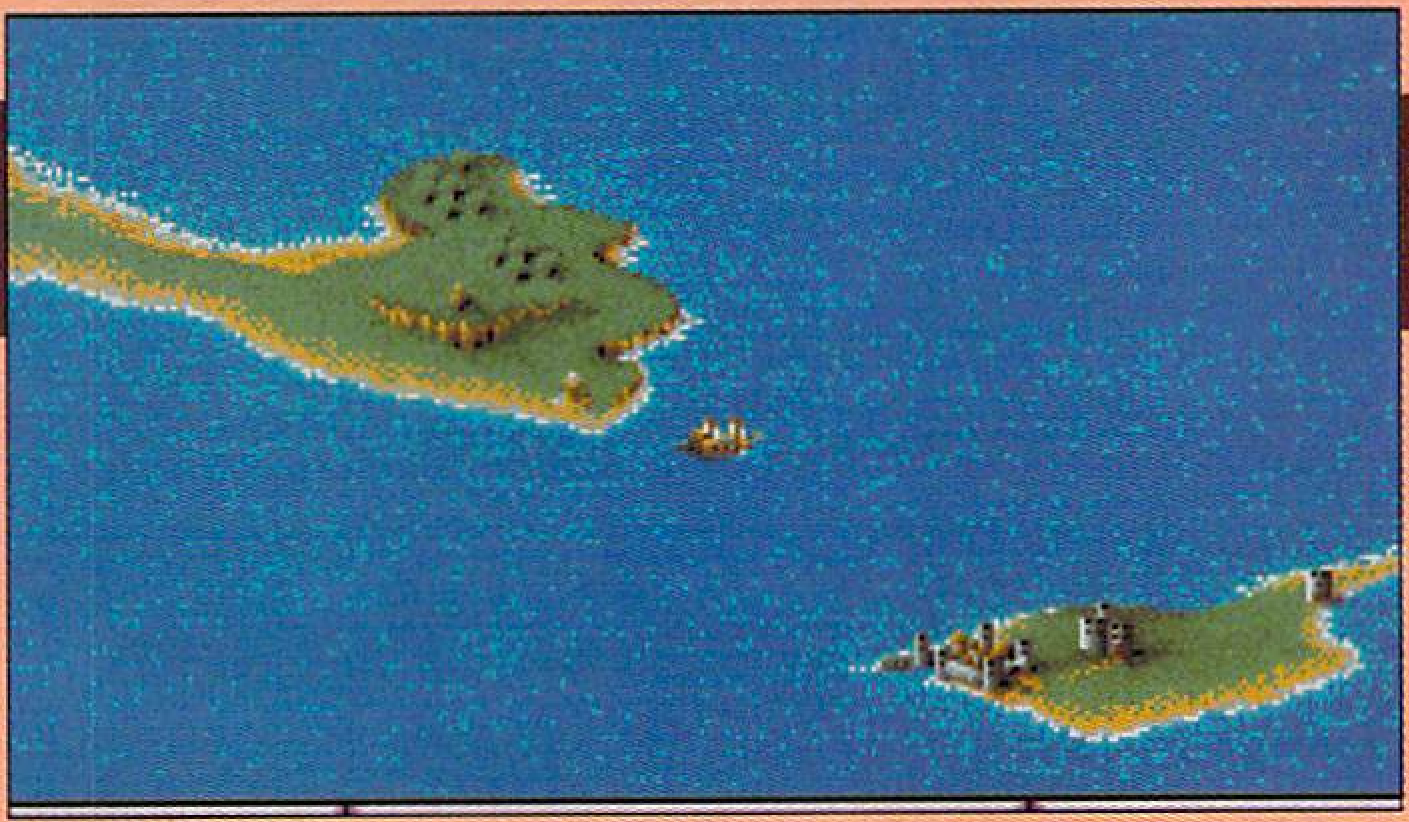
The end of each island, if you can bring yourself to kill all those horrible cute baddies, is guarded, reasonably enough I suppose, by a guardian.

This is usually a sort of jumbo mutant-sized version of one of the creatures you have already encountered. They don't look quite so cute when they take up most of the screen. The tune is a bit annoying, not as good as the Bubble Bobble soundtrack. Incidental effects don't vary much from the standard formula, but they're good enough.

If you like action but draw the line at the sight of intestines, then you won't find much better than Rainbow Islands. There's lots of it, too. Terribly uncool, though.

Green

Rainbow Islands *£19.95* *Ocean*	
Sound	███████░░░
Graphics	████████░░
Gameplay	████████░░
Value	█████████░
Overall – 80%	



Sitting by the dock of the bay

screen, and have you looking them up in the manual every time you want to use them.

The rest of the graphics are impressive. Very impressive even. I particularly like the scenes when you are laying seige to a castle and you get a panoramic view of your men running up and down, as well as cavalry charges and airstrikes from dragons.

There is a fair amount of strategy to the battles, it may not be simply a case of outnumbering the enemy.

Battles at sea are a bit of a let down though – it all boils down to how fast you can load a cannon.

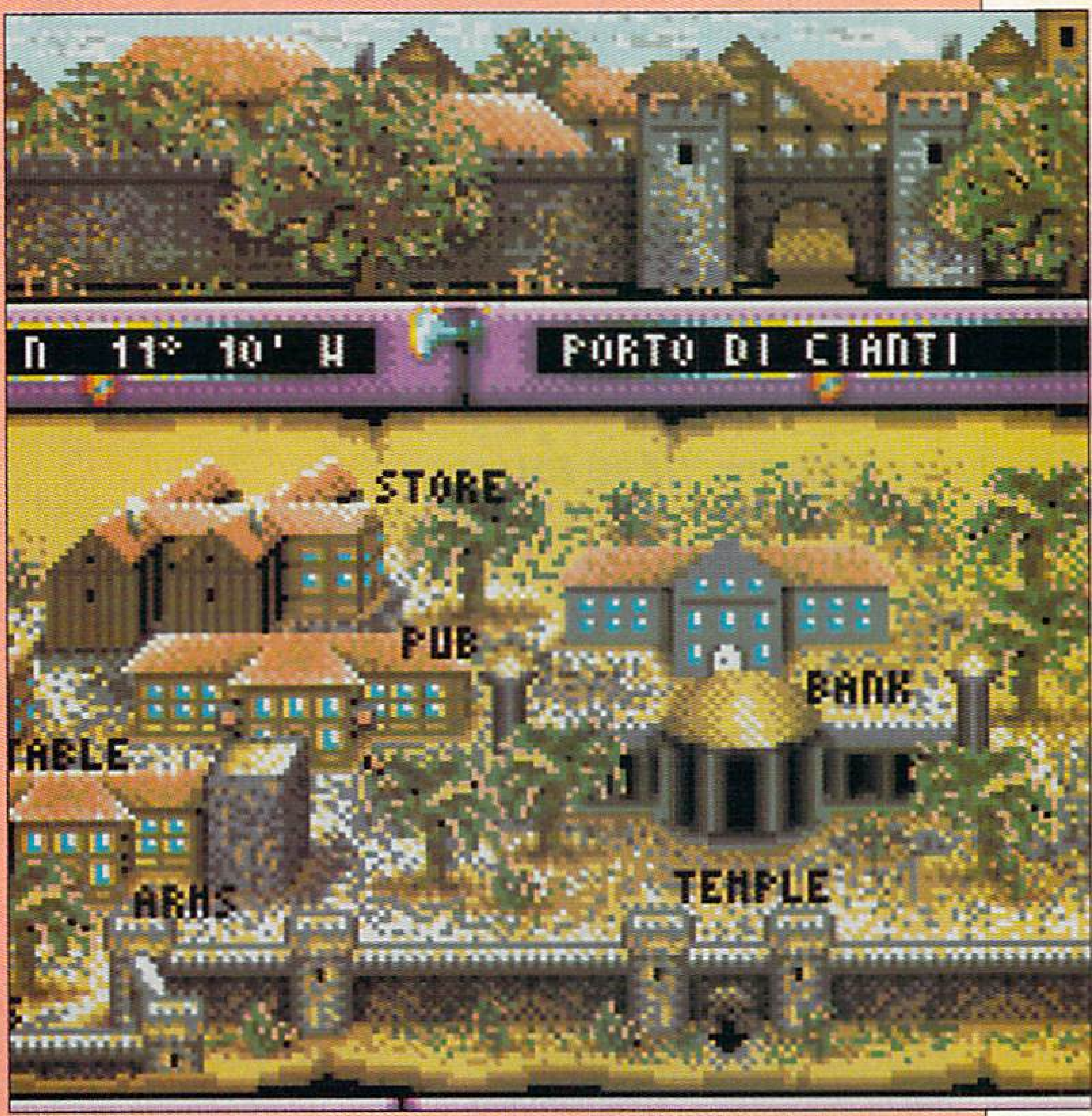
Individual army units are made up of humans, trolls, giants and other mythical life-forms. Each will detract or contribute to the unit's overall strength, intelligence and other fighting characteristics. The right troops have to be found for the right job.

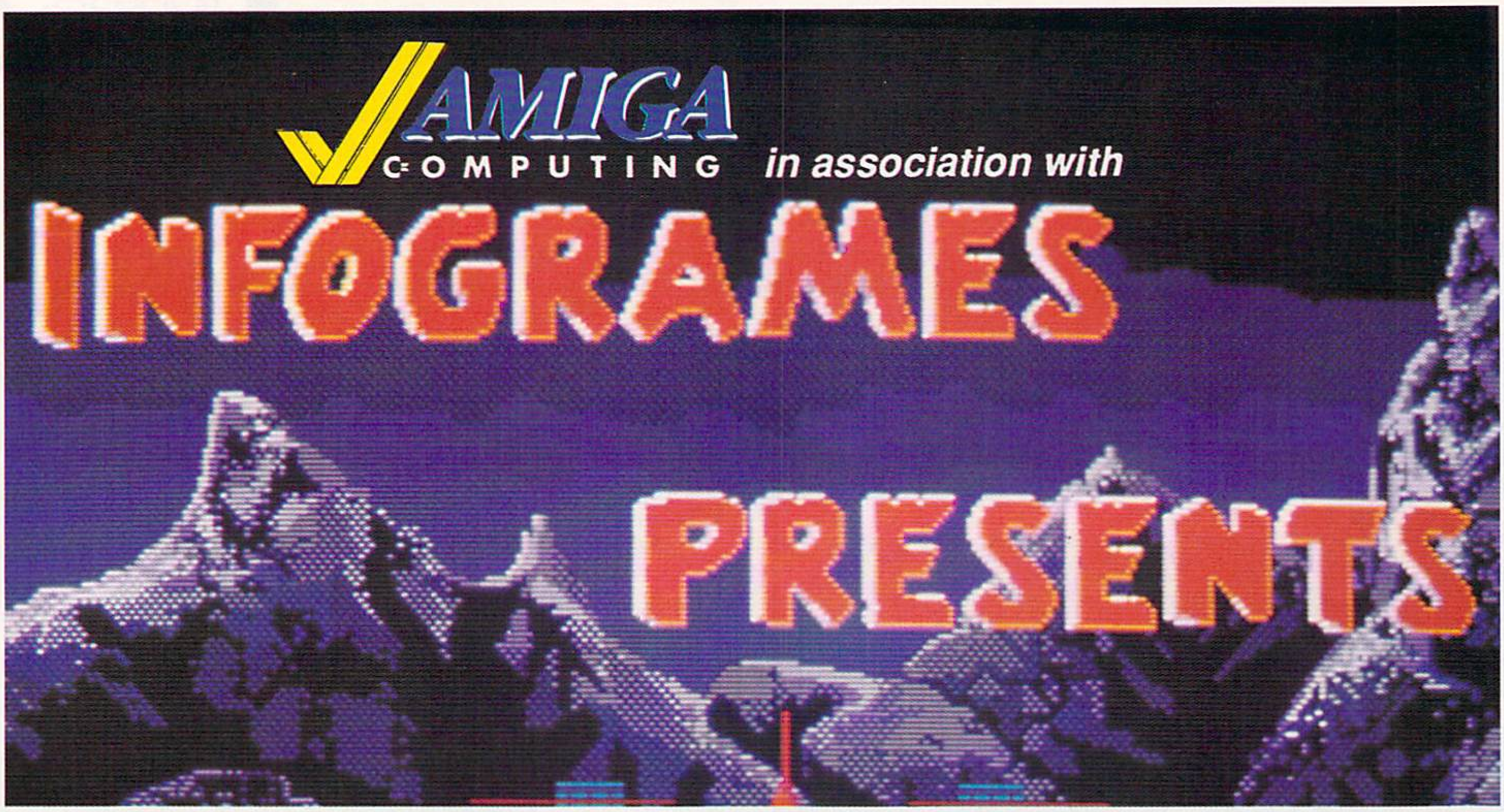
The music is OK but not exactly atmospheric and can get to be a bit painful after a while.

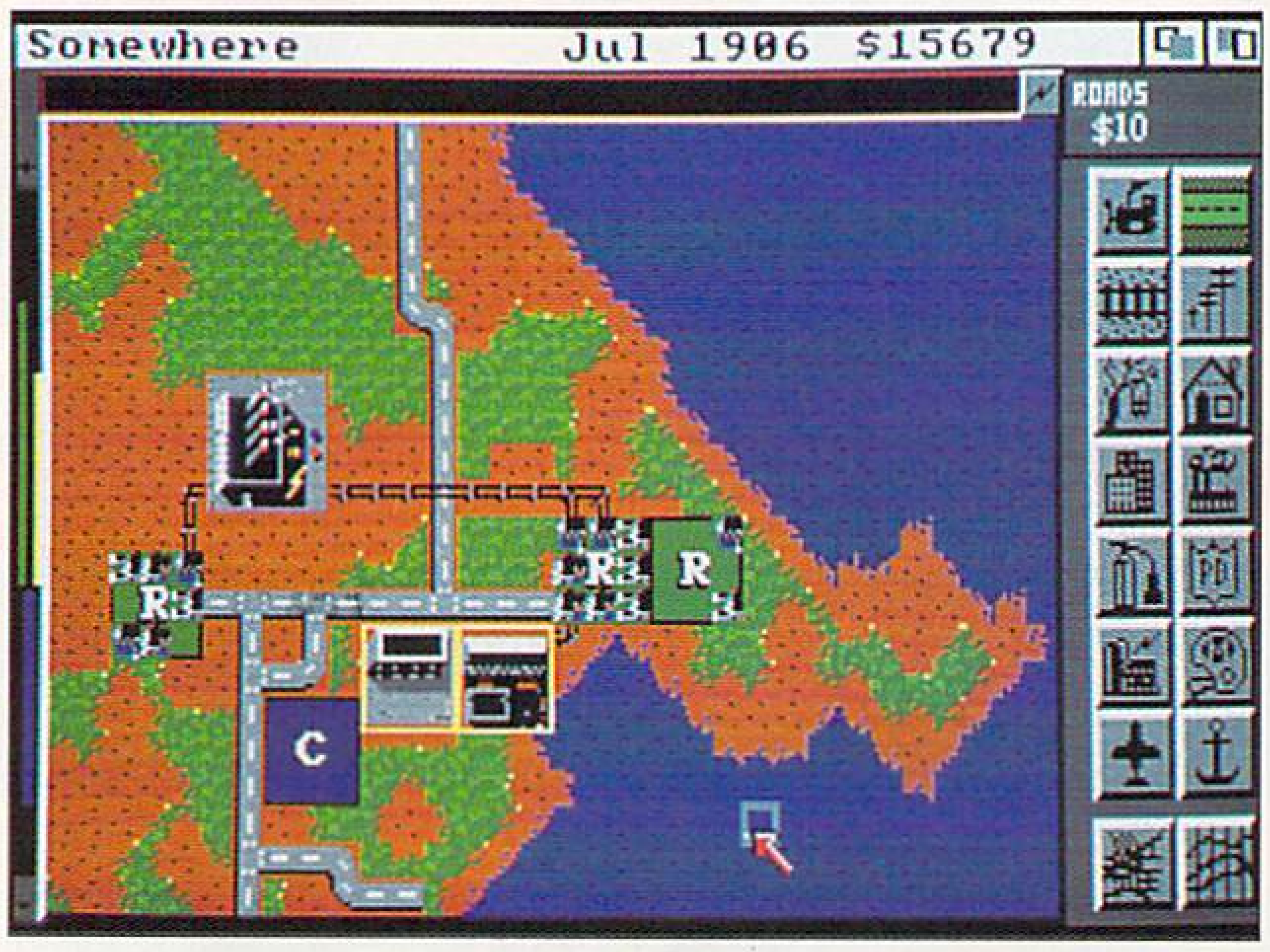
In the value stakes there is an awful lot to it, remaining interesting and playable right up to the end.

A worthy attempt to combine true strategy with adventure though perhaps the need for financial acumen and military skill deny the pure adventurer much scope for success.

Lucinda Orr







SIM CITY

You are in control of a city. Build the metropolis. Live your imperialist dreams. Can you rule for 100 years? The thinking man's Populous. ***SAVE £5!***

RRP £29.99
OUR PRICE
£24.99



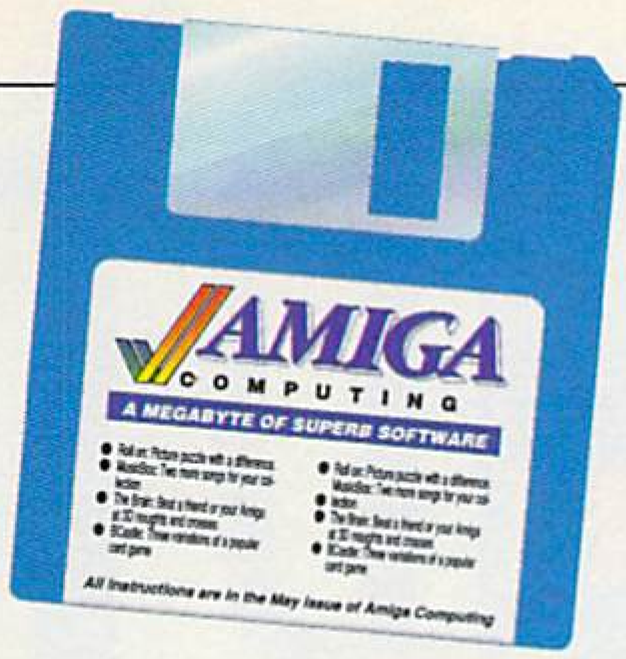
DRAKKHEN

The fate of the world lies in your hands. Magic, animation and monsters add up to a game which no role-playing enthusiast should miss. ***SAVE £5!***

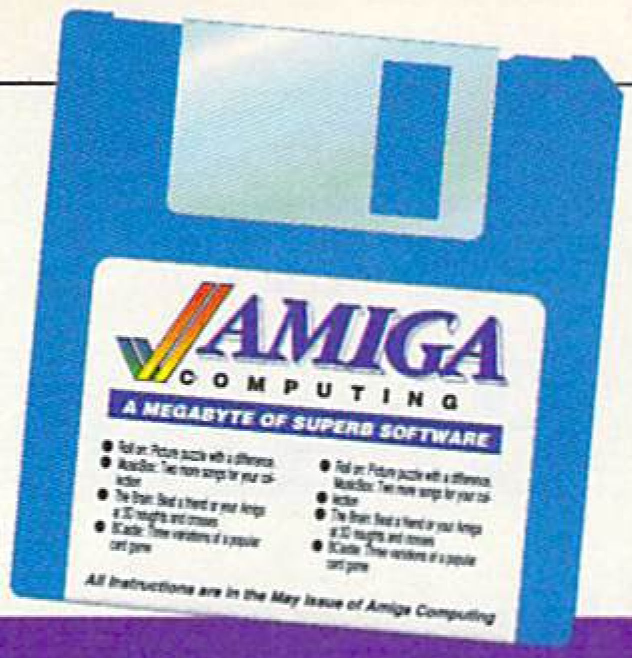
RRP £29.99
OUR PRICE
£24.99

Buy both and save £15!

PLEASE USE THE ORDER FORM ON PAGE 113



Jeff Walker presents...



THE DISC

MusicBox 1.4

MUSICBOX is a simple music player program using files Song0 to Song9 for stereo audio output. To run it, double click on its icon and a small window will appear on the Workbench.

The middle-left portion of the window is a mode gadget. Use this gadget to switch between Sequence, Random and Repeat modes. The middle-right portion is a selection gadget. Use this to select the next song, or replay the current song if in Repeat mode.

While the window is active the function keys F1 to F10 can be used to select songs Song0 to Song9 – the F1 key selects Song0, the F10 key Song9. The S key will Select the next song, the D key will toggle the play mode and Escape will terminate the program.

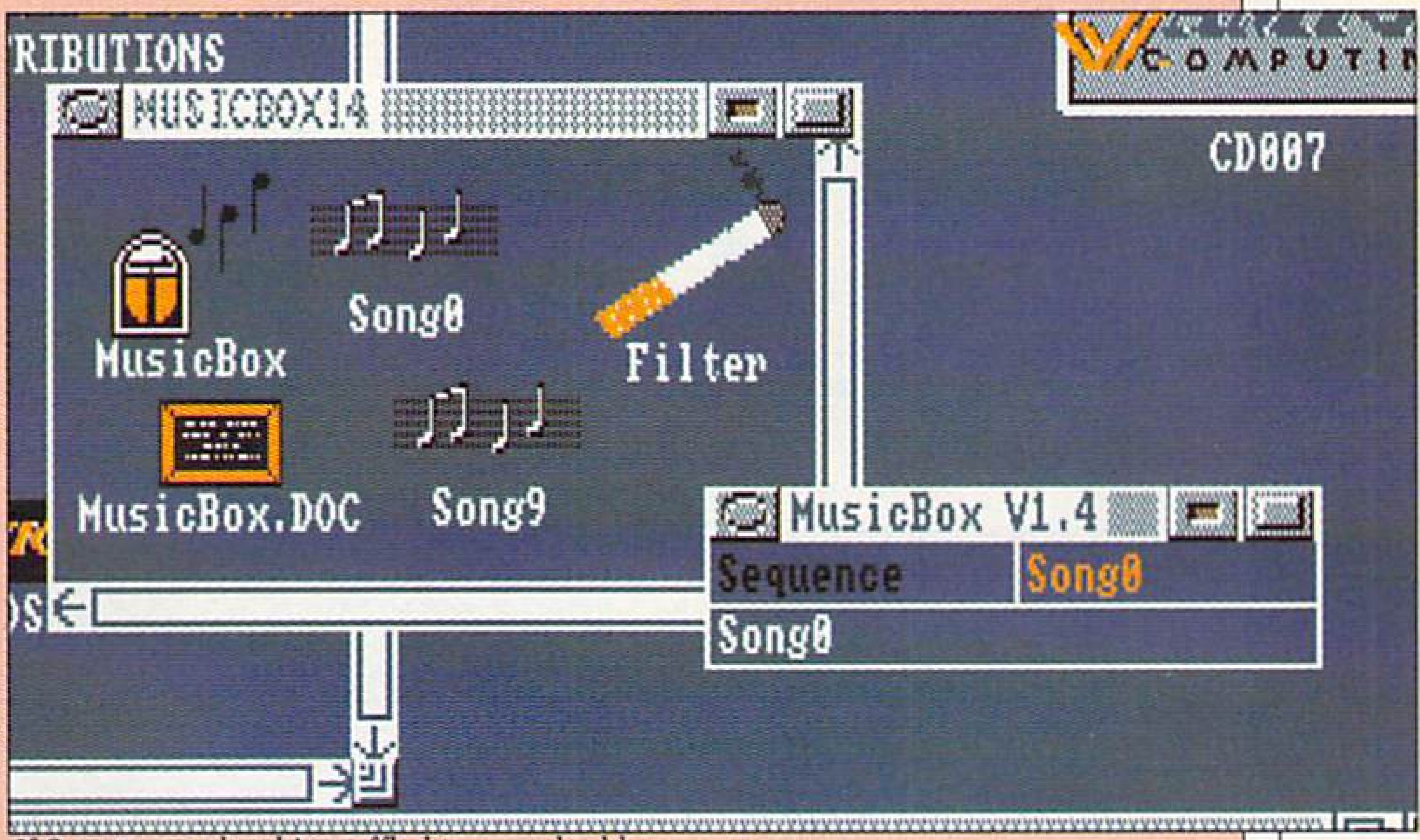
There are two more songs in the MusicBox drawer this month – the first was given to you on the January 1990 disc. Both this month's songs are music files produced using a pre-release version of SoundFX by Christian Haller and Christian A. Weber of Linel, Switzerland.

The format of these files has been altered for use with MusicBox and is not compatible with any other software, including SoundFX.

As of version 1.4, files produced with the SoundFX *Save-Final* option may be used without modification; that is, music files may be executable.

Additionally, music files are no longer restricted to the names Song0 to Song9. Use of the MusicBox icon Info Tool Types permits alternate music filename specification. A Tool Type entry of *Song0=FutureTrip* would indicate that the file name FutureTrip should be used whenever Song0 is selected.

Graphic display of the current music file name has been added to the control window. If no alternate name has been provided, the file name will be the same as the song selected. In the example above, the name *FutureTrip* would be used and displayed when the song selection was Song0.



If Song9 sounds a bit muffled to you, double click the Filter icon after it's started playing

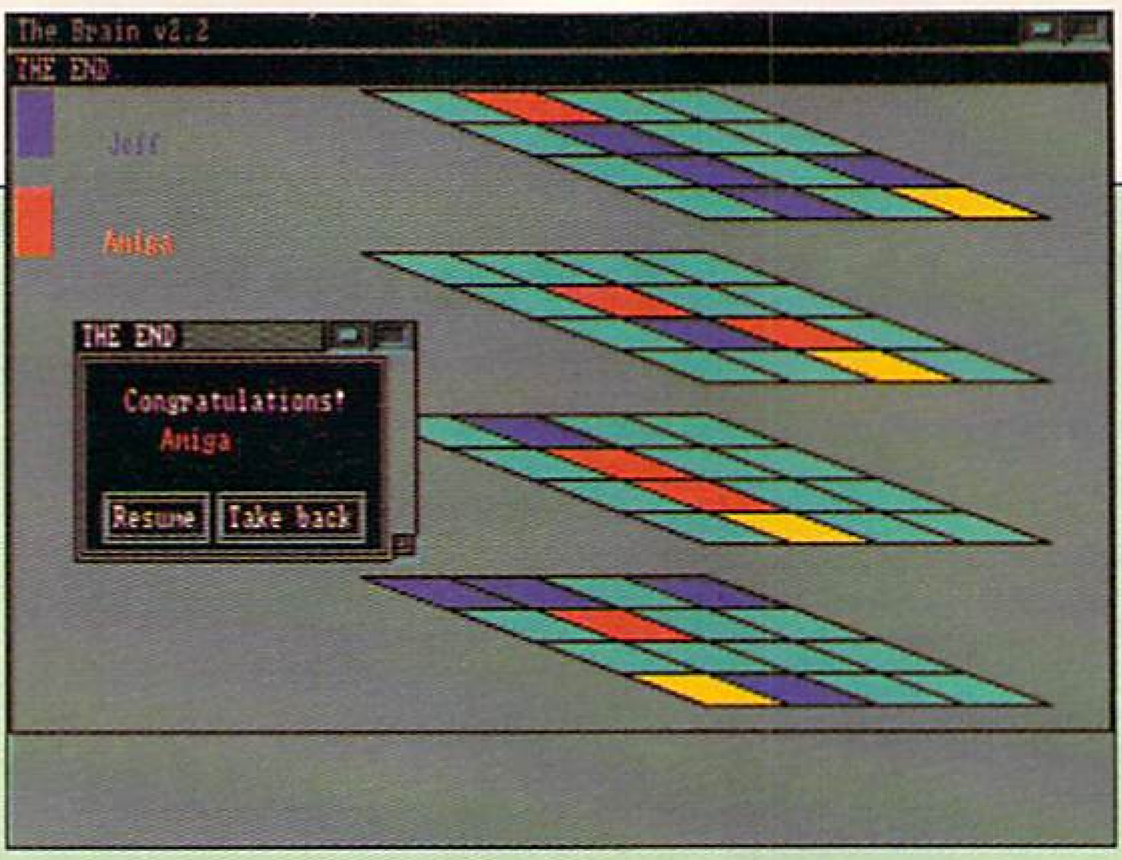
Because the filename references are stored in the MusicBox icon, CLI execution now requires the current directory to be that which contains the MusicBox.info file. Also, the file icon.library must be available in the Libs: directory.

Workbench execution has no additional requirements. Have fun. More MusicBox songs next month.

THIS program is freeware but remains © Copyright 1989 Peter L. Dunlap. MusicBox is distributed courtesy of CMOS BBS (Tel 0101-303-322-4078).

THE DI

The Brain



Shucks, beaten again. You need three eyes for this game!

WHATEVER you are prepared for, you'll get your brain tied in knots. Hence the name of this game. Having said that, The Brain is fairly simple to play; too simple maybe.

Imagine noughts and crosses in 3D, on a matrix composed of four planes of four rows and four columns. The goal is to draw a line of four cells, each of two players playing alternatively, just like ordinary noughts and crosses.

Every line in 3D is possible – horizontally, vertically, in depth, diagonally... There are 13 different lines and if you play against the computer you will soon learn to picture them easily. Play a few games and try every possibility because it's quite difficult at the start to "see" the lines.

You can play with two humans (if you can find any), or any combination of humans and four different computers. The game supports full mouse and menu controls, with graphics and digitised sounds – some originated from Perfect Sound and the game Crystal Hammer. The Brain multi-tasks, but play with task priorities if you use other programs because it uses a lot of CPU time.

To run the program double click on its icon. After selecting the players from the Players menu, choose Start New Game from the Project menu to begin.

A requester will appear with a default name for each human player. If you don't want to change it, just pass by clicking the left mouse button in the requester. If you want another name, click in the string gadget, type a name – 10 characters max – and hit Return.

Click on a cell to choose it. If you change your mind, don't release the left mouse button, move the pointer away from the board and then release the pressure. If it's too late, use Take Back from the Options menu. This will work even if you lost the next turn – the menu will be trapped but a requester will appear; you can "take back" all the way to the first move if you want.

You can change the players any time during game. If you set it to two computer players, the game will switch to demo mode.

If you decide to alter the board with the matrix editor, by adding or emptying cells, the Options menu will be disabled when you return to the game because those routines only work with normal gameplay.

Patrick Debaumarché, the programmer, says that the computer's strategy was the toughest part of the programming. He managed to alter computer thinking in two ways, making four different strategies.

Amiga Bulldozer is kind of, um, bullish. It builds lines quickly without thinking in advance, but can defend itself violently if you always try to line two cells up.

Amiga Smart is the best human adversary. Although it seems to play randomly at first, don't be fooled, it thinks two moves ahead. This stinker builds a very efficient strategy which will really puzzle you.

The 1 and 2 after Smart and Bulldozer give you a further choice – with 1 the computer plays randomly in tied situations and with 2 it plays smarter, trying to take advantage of the best positions still free.

In Suggest Move, the algorithm is set to Bulldozer 1.

Don't be upset if you're always beaten in your early games. That's normal. Some of Patrick's beta testers still haven't beaten the computer once, even in Bulldozer mode!

PATRICK DEBAUMARCHÉ is a 20-year-old student completing his second year of a DEUG degree at the scientific university of Bordeaux.

He owns a 1 meg A500 with external drive, a 9-pin dot matrix printer and a sound digitizer (Perfect Sound). He bought his Amiga in the USA two years ago and converted it to PAL last year by changing his Fat Agnus.

Patrick uses his computer mainly for programming – switching only recently from Amiga Basic to assembly language – and for composing music, using SoundTracker mostly.

If you have any suggestions or comments – for instance Patrick is thinking of a 5x5x5 matrix for a future version – send them to: Patrick Debaumarché, 75 avenue du Parc de Lescure, 33000 Bordeaux, France.

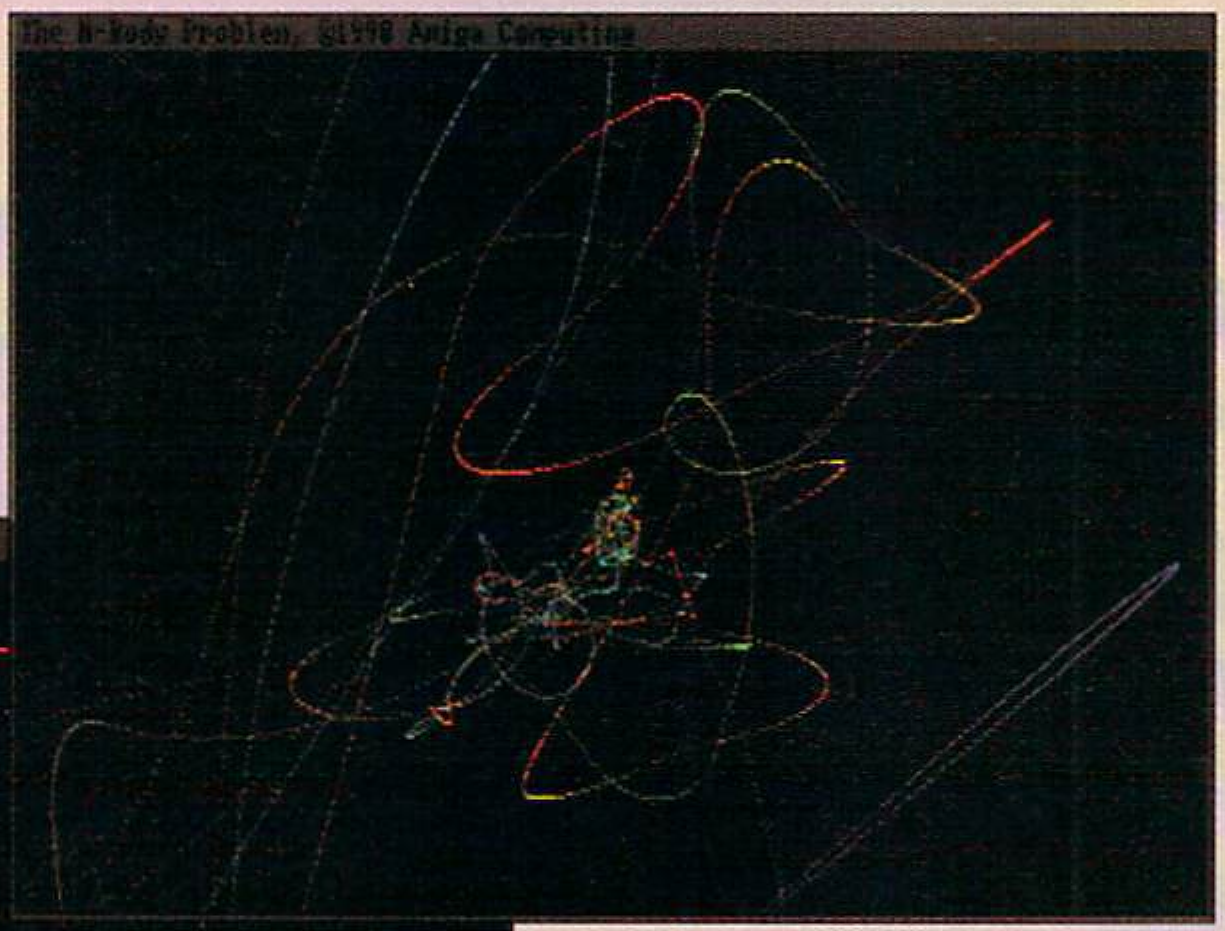
Chaos

WE'RE into the second month of Alastair Scott's series, and in the Chaos drawer you'll find the two program's from this month's article, plus the three from last month.

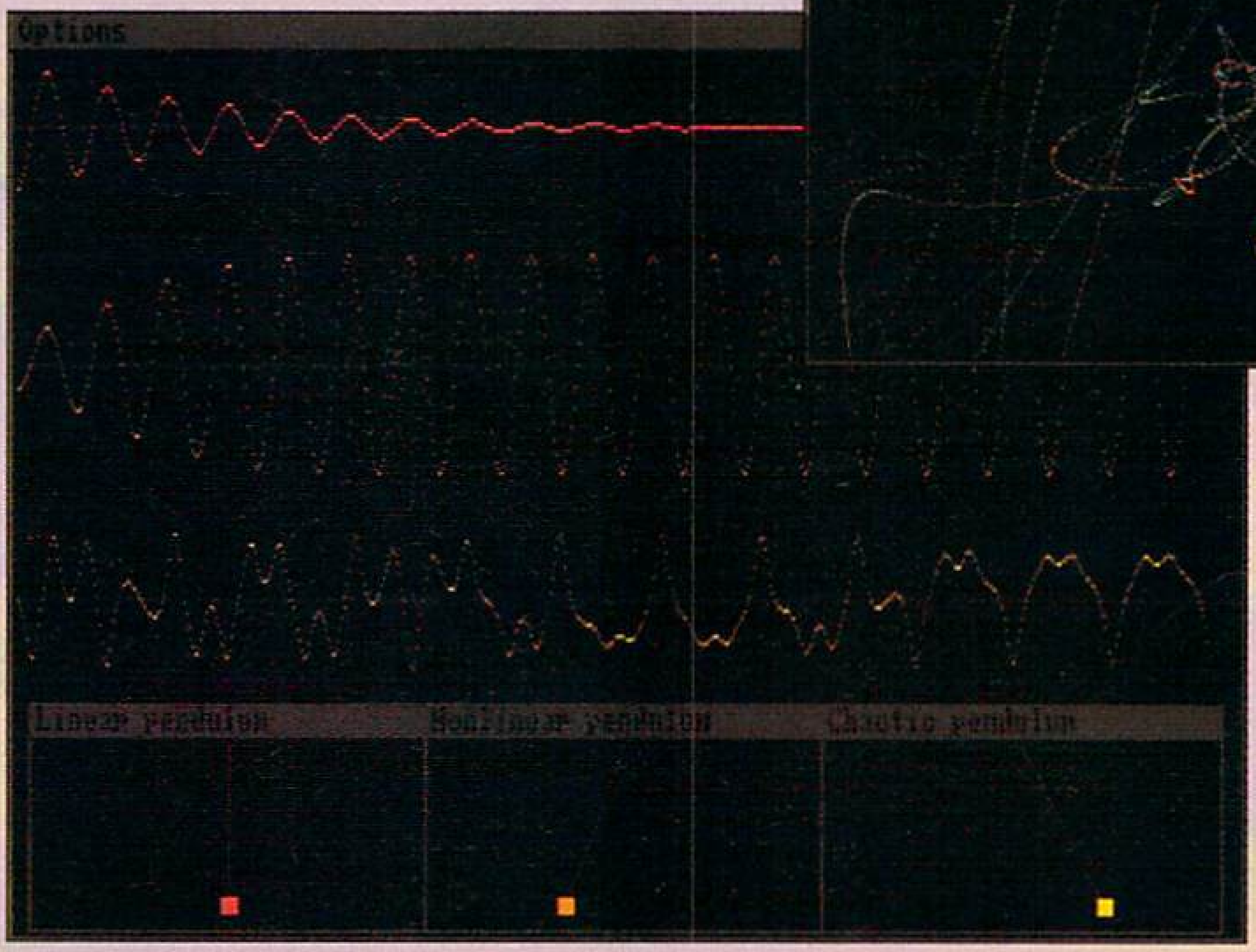
If you've typed the listings in you'll have noticed that due to the complicated chaotic formulae they tend to crawl along at a fairly sober pace. Never fear, HiSoft Basic Complier is here! It's worth typing the listings into Amiga Basic just to see how much faster the compiled versions run.

See last month's article and this month's on page XX for instructions on how to use them.

More compiled chaos next month.



The N-Body Problem. It may look like scribble, but it took scientists centuries to work out how to do it



Three Pendula – show this to your doctor and get a few weeks off work

PPMore 1.2

PPMORE was written to complement one of Nico François' other utilities, PowerPacker, the command and data cruncher we gave you on the October 1989 cover disc. PPMore is used to read normal Ascii text files or text files crunched with PowerPacker.

The program is about 6k long, and when you realise that you can save about 60 per cent by crunching a text file, you can see that PPMore could save a lot of space on your discs.

The program was written as a replacement for More, so Nico tried to keep the keyboard commands the same, as well as adding new ones. There are two main differences between PPMore and More – PPMore uses gadgets and it always loads the complete file into memory; More only loads part of the file, loading the rest when needed. If you can live with these differences, you can replace More with PPMore anywhere you want.

PPMore can be used in three different ways. First of all via the CLI. If you type *ppmore* without arguments you will get a usage template. You use PPMore like this:

```
PPMore <filename>
```

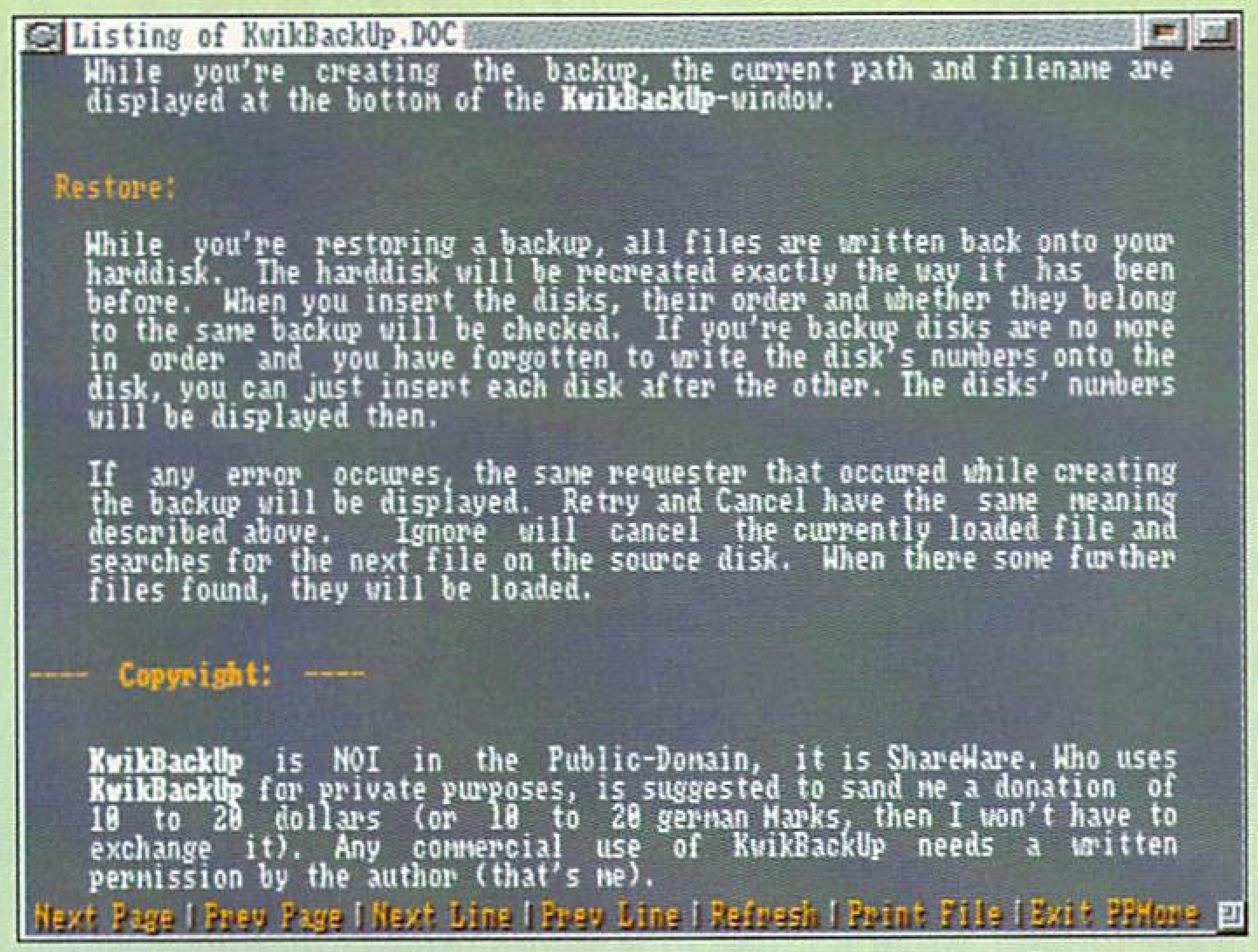
The program will then load the Ascii file called *filename* and display it. If the file was crunched using PowerPacker 1.1 or higher, PPMore will first de-crunch it for you. If the file was encrypted you will be prompted for the password.

There are three different ways of using PPMore via the workbench – you can set the default tool of the crunched or de-crunched text file to PPMore, you can single click the PPMore icon and then double click the text file icon, or you can double click the PPMore icon and enter the filename in the string gadget you will be presented with.

You set the default tool by single clicking the icon of the text file and selecting Info from the Workbench menu (this only works if info.library is in the Libs: directory). You will get a window with several gadgets in it, click in the string gadget where it says Default Tool and enter *:ppmore*. PPMore should be in the root directory of your disc for this to work. If, for example, PPMore is in the System directory, you should enter *:system/ppmore*. Last of all, select the Save gadget.

PPMore will add the suffix .pp to the filename when the file was not found. This is very useful in the workbench environment – you can make an icon for text.doc but name the file text.doc.pp. Now the Workbench will show an icon with text.doc as the name, but if you double click it text.doc.pp will be displayed. As long as there is no text.doc file in the directory, of course.

PPMore can be controlled by keyboard or gadgets. To get a summary of the keyboard commands press Help when reading a text file, the function of the gadgets should not be hard to understand.



PPMore supports all the CLI escape sequences to display different text styles and colours

PPMORE is freeware. This means that you can give copies to your friends as long as you don't ask any money for it.

If you haven't got PowerPacker you are of course missing the main feature of PPMore. You can try to find it in your favourite public domain library or you can get it by writing to Nico, adding £10 if you live in Europe, $20 US if you live elsewhere. Send money in Belgian Francs (BF) by International Money Order or EuroCheque.

If you have suggestions or remarks about this program, or if you find any bugs, please let the author know. Write to: Nico François, Corbielaan 13, 3060 Bertem, Belgium.

Program history

Version 1.0: First release.
Version 1.1: .pp suffix added to filename when file not found, very useful in Workbench environment. PPMore now also loads encrypted files (PowerPacker 2.3a or higher).
Version 1.2: Rewritten some routines in assembler, results in a slightly faster and smaller PPMore. Keyboard input improved. Auto-repeat of keys is ignored so you can keep on pressing without typing it 20 times ahead. Gadget input also improved, now handles repeat. PPMore now prompts for a filename when double clicked from Workbench.

Printing

YOU can continue to read the text when PPMore is printing, but you can't quit until the hardcopy is finished.

For PPMore to be able to print you will need to have printer.device in the Devs: directory and the correct printer driver for your printer in Devs:printers/. You should also have a correct system-configuration saved for your printer. (See the A500 User's Manual, Using Preferences, chapter 6-11.)

OpenLook

A LOT of you may have seen programs that modify how the system gadgets appear; there was one called NewLook, for instance, on the December 1989 cover disc. Well, Robert A. Schader, the author of OpenLook, thinks that his effort is the best yet.

The gadgets look good with the system's default colours even on a one bitplane screen. They were somewhat styled from the openlook/motif on Unix machines. Robert had high hopes of altering the Workbench's window gadgets as well – scroll gadgets and arrows – but after numerous attempts that proved too difficult. If anyone can help Robert with this, do write him.

OpenLook modifies the IntuitionBase structure in a way which is documented but not approved by Commodore it may not work with future versions of the Amiga operating system. It does, however, work well with Workbench 1.3 running under Kickstart 1.2 or Kickstart 1.3.

To run the program, double click on its icon or install it in your startup-sequence. The program will immediately modify the first screen's gadgets, and anything else (windows or screens) which are opened later will have the new gadgets.

Any windows which are already opened when the program is executed will still have the old gadgets attached. Also any screens which use a lo-res width of 320 pixels will not be affected. (Who uses those anyway?) Windows with old gadget images may be updated by closing and then reopening them.

Enjoy, and let Robert know what you think.

OPENLOOK is copyright © 1989 by Robert A. Schader. You may consider this program as freeware, use it as you please. If you have any comments or bug reports, write to: Robert Schader, 3631 Colby S.W., Wyoming, MI 49509, USA (Tel 0101-616-531-6083).

TrackSalve

TRACKSALVE was written to improve the trackdisk device, which has some problems and lacks options. As far as D. W. Reisig, the author of TrackSalve knows, there are two bugs in trackdisk, of which one is very bad if more than one drive is connected.

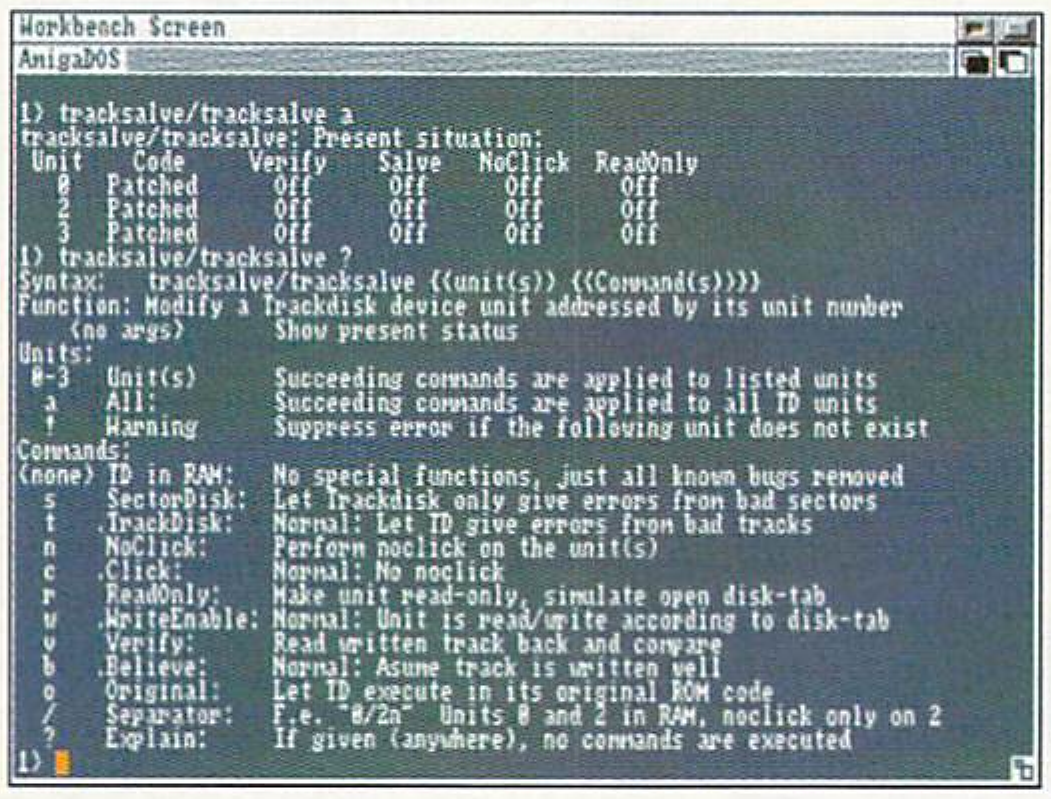
SetPatch 1.3.2 tries to do something about it (December 1989 cover disc), but it is not enough. For instance, there are people who do not like the sound of an empty drive clicking. Because trackdisk can't handle a track with an error on it, all data on that track is lost. And we never know whether the data that has just been written is stored correctly on disc. And as we are poking around in trackdisk, we might as well make a drive optional read-only.

TrackSalve is used exclusively from the command line. If anywhere on that command line one of the characters h, H, or ? is found, the whole command line is ignored and a small usage explanation is printed, as shown in the screen shot.

Commas, spaces and dashes are ignored. Characters which are not defined lead to an abortion of the program without executing any function. This will be emphasised by a message via standard out. For those of you wishing to use TrackSalve in scripts, note that abortion always has a return value of 20.

You must address a floppy drive unit by its number, not its name. This is because we are modifying an Exec device, not a Dos device.

Valid numbers are 0, 1, 2, 3, a and A, or any combination of them. (A or a means all units.) Commands are single characters.



Run TrackSalve with a parameter of 0n to stop your internal drive clicking

Before you give a command you must specify one or more units to apply the command to. A command will be passed to all directly preceding listed units. If a unit is given that does not exist, then this is an error and nothing will be done at all.

It is possible to specify a unit that does not exist. Normally execution would be aborted, but if an exclamation mark is put before a possible non-existing unit, a message is displayed and the the program continues but returns an error code of 5.

Entering just a list of units and no commands – *tracksalve a* or *tracksalve 023* say – results in trackdisk being patched into ram with repaired bugs.

Commands are applied only to preceding units. For example:

```
tracksalve 01n
```

lets units 0 and 1 stop clicking. Now you can add new unit numbers like:

```
tracksalve 01n2r1s
```

which results in noclick on units 0 and 1, unit 2 is read- only and unit 1 can salvage tracks. It is also possible to give contradictory commands:

```
tracksalve an1c
```

enables noclick for all units except unit 1.

The separator / is a do-nothing command or unit-list reset:

```
tracksalve 012/2n
```

lets the units 0, 1 and 2 execute in ram, but noclick is only enabled for unit 2.

TrackSalve without any parameters displays the present situation and changes nothing, as can be seen at the top of the screen shot.

Although DiskSalv (August 1989 cover disc) works well on its own, DiskSalv and TrackSalve work very well together. Both programs will generally operate faster and more clearly. It is also possible that between them the combination will salvage more data.

Sometimes only one file on the disc is worth the effort of salvaging, like the latest modification of a file not yet on a backup. With TrackSalve installed there is a chance that this file can be rescued from the damaged disc with the Copy command, which might save some time.

Then it is possible that immediately aÊter disc insertion a requester appears with Unreadable, Use Diskdoctor and so forth. There is a fair chance that with TrackSalve these requesters will stay away and the disc will be accepted as a Dos disc. You can do more in that case.

How it works

THE trackdisk code will be copied from the operating system program into ram, modified and extended. The unit task can execute either this patched code or the original code in rom for each separate unit.

If a unit cannot be found for which to execute the patched code, this is reported in a message on standard out and the program will continue normally, but its return value will be 10.

There are two functions which use a buffer of about 26k. If this memory is not available at the moment of enabling, TrackSalve will attempt to allocate it again every 2.5 seconds.

The function is inactive until the allocation is successful. This is reported through a message, and the return value will be 10. Enter *tracksalve* without parameters to make sure the function has become active.

The buffer is shared between all tasks. Normally this will work smoothly and without delay, except when a requester is displayed. The requester is used when a verify error has been detected.

If for some reason it is not possible to pop up a requester, TrackSalve will loop, re-writing the track and blinking the drive's LED until the conditions have changed. These conditions are: (1) The disc is removed, (2) The bad track becomes good, or (3) There is enough memory to display the requester.

THE DI

Roll On

ROLL ON is a slider puzzle. Yes, another one, but this time with a different approach. You need another way of thinking to solve it. To start the game, double click on the RollOn icon and

TRACKSALVE is Copyright © 1990 D. W. Reisig and is freely distributable on a non-commercial basis. Comments and bug reports to: D.W. Reisig, Woudweeren 10, 1151 AV Broek in Waterland, Holland.

What it does

TWO bugs have been patched – the TD_RAWREAD/TD_RAWWRITE bug and the NoDisk routine. Now it is safe to do I/O on one drive and leave all your other drives empty.

Noclick can be switched on and off for each separate drive unit. Some drives have an electrical switch at the home position to prevent stepping below zero. Other types have a mechanical stop, so you can't get them completely silent.

The author of TrackSalve thinks it is safe to use noclick on the first type of drive, but those readers with a mechanical stop in their drives should not switch noclick on.

Each drive can act as if the protection tab of the inserted disc is open (write protected). This is not as simple as it sounds.

The FileSystem keeps track of disc swapping, and it naturally assumes that you are not able to shift the protection tab while a disc is in the drive. Therefore, if there is a write enabled disc in the drive and the software is switched over to read-only or

SC

THE author of RollOn, WJF Stapper, is 32 years old and lives in Amsterdam. Willie (sorry, can't pronounce WJF) has an Amiga 2000 with a BridgeBoard, 2 meg expansion and a second floppy drive. He borrowed the money to buy his set-up and now he is broke. But not for much longer. Cheque's in the post, Willie.



Roll On, proving once again what can be achieved in Amiga Basic if you really put your mind to it

wait a while. Quite a while. It's in Amiga Basic, you see. Which will freak you out when you discover how solid and professional it feels. It never ceases to amaze me how Amiga owners can write such wonderful programs in such a pig of a language.

Every time I say it's imposssible to write anything worth keeping in Amiga Basic, along comes another disc to prove me wrong. Keep them coming!

OK. Now that Roll On has loaded, on the right-hand side of the screen you will see a bar with four buttons – Start, which mixes up the picture, Next, which loads a new picture, Level, which mixes the picture up some more, and Stop, if you like to cheat.

There is one menu item you can use, Quit. Guess what that does. All the rest is self-evident... Oh yes, one last thing If you don't have a memory expansion make sure you switch off or remove all external drives and close all unnecessary windows before double clicking the RollOn icon, otherwise you'll get an "Out of heap space" message.

read/write, a DiskChange is sent out.

This is very unfriendly during a write, so it is delayed until the motor is switched off. Nevertheless, switch a drive from read/write to read-only, or vice-versa, only when the drive is not spinning.

If trackdisk gives up on a track, the the TrackSalvage function – if enabled – comes to action. The track is read again and analysed. All unsuspicious data is recovered and stored in trackdisk's buffers.

If the requested data is recovered, no error is passed to the calling task, but an attempt to write to this track is denied and results in a disc error. So faulty tracks are read-only.

TrackSalve can read back a just-written track to check whether the data was saved correctly. It reads the track into a special buffer which is compared with the original write buffer.

Since the Amiga is multitasking, it is not possible to know which task should be notified about an error. Therefore it is the user who must decide about this. You can choose between rewrite and ignore.

Rewrite writes the original buffer back to disc and ignores it as if we never knew about the bad track. It may be that subsequent re-writes do not lead to a good result. At least the fact is known that something is wrong.

Adding more puzzles to RollOn

1. Start a drawing program using a lo-res, 32 colour screen.
2. Load in RollOn.color. Now you have the right colour set-up.
3. Fill the box with a nice picture. When necessary, load PuzzleBox.brush into your drawing program.
4. Save your picture and convert the file to ACBM format with the LoadILBM-SaveACBM program.
5. Load and start the Cut-A-Brush program. A filename will be asked for. Use the name of the file you converted to ACBM format.
6. When the picture is loaded you will see a box connected to the mouse pointer with the sizes of a puzzle used by RollOn.
7. Move the box until it exactly overlaps the picture you have made – exactly! – and click the left mouse button.
8. A new window will appear showing your cut-out. When satisfied, save the picture. Name your puzzle "p 4", your second puzzle "p 5", and so on (there's a space between the p and the number).
9. When saved there will be some information about the file length. Click a key to leave the program.
10. Place the new file(s) in the RollOn drawer. (You'll have to copy the RollOn drawer to another disc first – the cover disc is packed to capacity.)
11. Double click on RollOn and choose Stop from the Amiga Basic menu bar while the program is loading.
12. List label "wacht1" (a Dutch-named label, sorry). Somewhere in the middle of the screen you will see a line with the following statements:

```
getal=getal+1:IF
getal=4 THEN getal=1
```

13. Change the 4 into a new number, namely the number of puzzles + 1. Remember, there are already three puzzles on the disc.
14. Save the amended program, and away you go.

MinTerm

PROGRAMMING the blitter in assembly language can be a tedious and frustrating job – having to work out lots of logic equations for the LF code of BLTCON0, more commonly known to us mortals as the minterm. Now you can treat yourself with this small utility which does all the conversion work for you.

No more trying the same equation five times and getting a different minterm each attempt. All you have to do is follow the rules and use MinTerm, the utility.

After calling MinTerm from CLI or double clicking it from Workbench, a small window is opened in the top left-hand corner of the screen. You can move this window wherever you like and you can send it to back or to front using the usual Intuition window gadgets.

There is a string gadget with a border around it. Click inside the string gadget and type in the logical equation you want to find the minterm for. For example, if the equation is D=A OR B, you'd type in only A+B. The plus sign stands for the OR operation.

If you wanted to do D=A AND B you would type in A.B. The full ➤

stop between A and B stands for the AND operation. However the same equation is sometimes written D=AB, so you can type just AB instead of A.B since both are correct and both are recognised by the program.

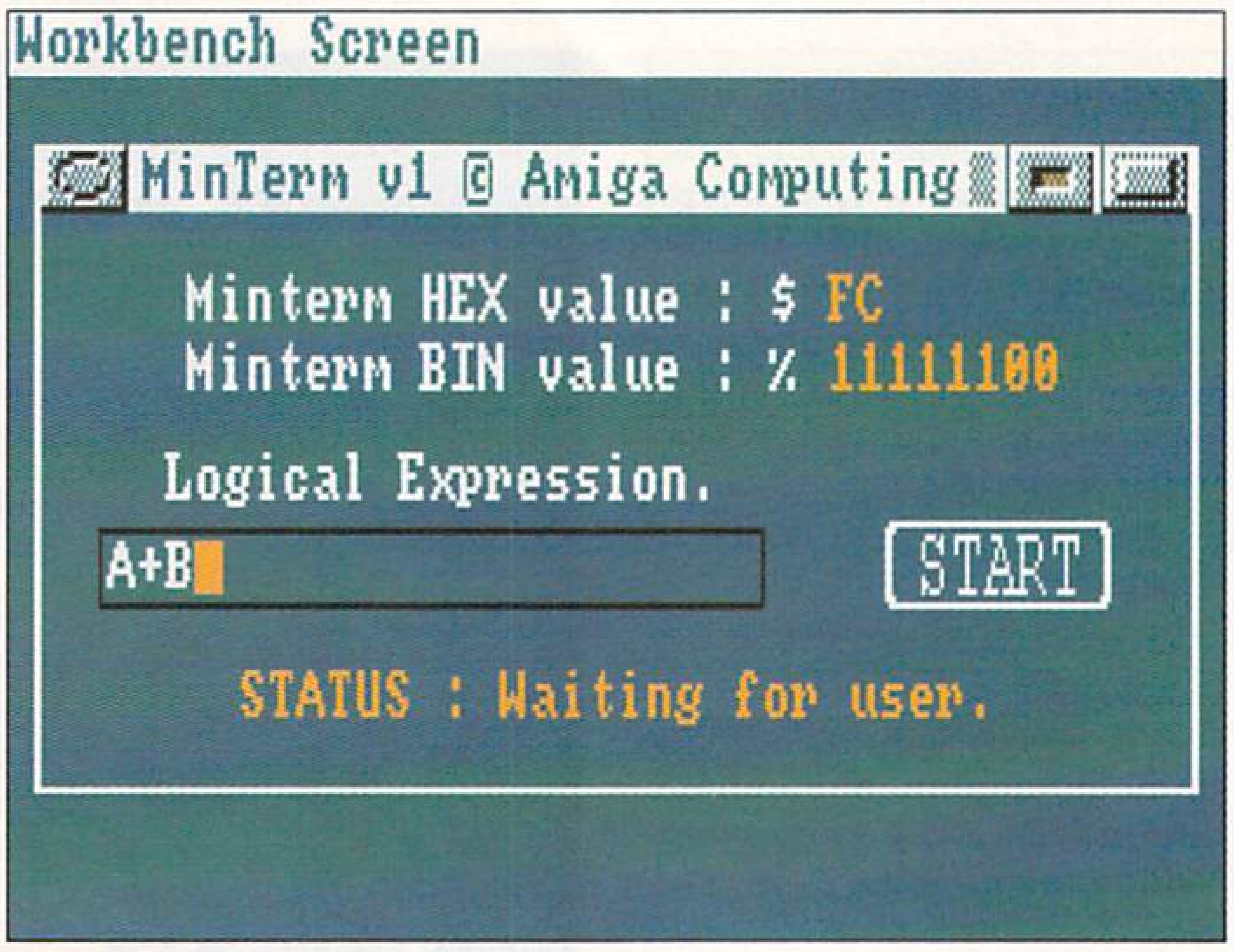
After doing some simple equations you might want to try more complex ones using the NOT operation. But hey, how do we type in such equations as D=A+(NOT C), where (NOT C) is normally represented by a C with a bar above it.

Keeping in mind that there's no key for a (NOT C) on the Amiga keyboard (nor on our typesetting machine), MinTerm programmers Christian Fiott and Torgeir Dingsoyr have opted for a neat solution – all you need to do is to put an asterisk before each part you want invert.

So, (NOT C) becomes *C, ((NOT A)+(NOT B)) becomes *(A+B), AB+(NOT A)C becomes AB+*AC and (NOT B)+(NOT C) becomes *B+*C.

Simple, eh? Now you can do any equation you like. Once you have typed the equation into the string gadget, click on the Start gadget and the resultant minterm is displayed in hex and binary form.

OK, now you have no excuse not to use the blitter.



MinTerm, making life easier for the blitter programmer

Mistooks in the manual

IF YOU are going to try examples from the Amiga Hardware Reference Manual (revised edition, Page 171, Blitter Hardware) there are couple of things you should bear in mind.

Firstly, although the bar on top of equations such as AC is joined – only one single bar is drawn from A to C – in real life they should be separated, that is the NOT operation should be carried out for each value. In MinTerm you would enter *A*C. As it is, some people would try *(AC), which is not what the manual intended.

Secondly, The expression D=AC (bar above A and C again, that is *A*C) gives a minterm of $05. The manual shows a value of $11 instead. Most probably there is an A misprinted for a B.

THE DI

Disc problems?

SUBSCRIBERS

If you subscribe to *Amiga Computing* and your disc has got damaged in the post, please return it to:

Amiga Cover Disc, Database Direct, FREEPOST, Ellesmere Port, South Wirral, L65 3EB.

You will be sent a replacement with our compliments. Please allow 28 days for delivery.

BCastle

BCASTLE plays three different variants of the patience game Beleagured Castle. Double click its icon and a window will be opened on the workbench screen containing a requester for the choice of game. Click on the gadget for the game you want to play. The cards will be shuffled and dealt in accordance with the rules of the chosen game. Quit at any time by clicking on the close gadget.

The upper part of the window contains the card layout and the lower part is used to display messages. Error messages come up in white and warning messages in orange.

Cards can be moved between rows and on to bases – the four piles in the centre – by positioning the mouse pointer over the card to be moved and clicking the left mouse button. The pointer will change into a representation of the selected card.

Position the pointer over the card or space on to which the selected card is to be moved, click the left mouse button again and the card will be moved.

Unless cheat mode is selected, only moves which conform to the rules are allowed. A selected card may be de-selected by either selecting the same card again or by selecting an item from the Project or the Undo menu.

Use Show Moves from the Search menu for a hint. A list of possible legal moves will be constructed and displayed one at a time. The card which may be moved is highlighted black and the card which it can be moved on to is highlighted blue. Spaces are highlighted in white.

Use Undo Move if you make a mistake. Moves can be undone until the earliest saved (normally the first) move. If the start of the list is reached the message *No moves to undo* appears.

If cheat mode is on the menu option is ticked and moves are not checked for conformity to the rules. The Show Moves facility (see above) ignores the setting of cheat mode, only legal moves are shown.

The Help menu item uses the PD utility Less to display the documentation. Neither of these files are on the cover disc (you are at this very moment reading the documentation!) so Help won't work.

If the game is won, a requester is displayed giving the option of either quitting or playing another game.

Good luck... and have patience!

BCASTLE was written by ex-professional programmer turned housewife, Jennifer A. Hackett.

Jennifer, who is currently living in Obernai, France, owns an A500 with A501 memory expansion, Amigos 40 meg hard drive, Brother M1009 printer and a second floppy drive. The program was developed under Workbench 1.3 using Lattice C v5.04, menus and requesters were designed using Requester Construction Tool v1.0 by Maxon Computer GmbH.

RULES

Beleagured Castle

THE four aces are dealt in a central face-up column; these are known as the "bases". The remainder of the pack is then shuffled and dealt in face-up columns, alternating left and right, to form eight rows of six overlapping cards, four rows to the left and four rows to the right of the bases.

The outermost card of each row is available for building on the base of the same suit, in ascending order up to the king. When the entire pack is built, the game is won.

An available card (the outermost card of each row) may be moved on to the outermost car‰ of another row of any suit, but only in descending order. For example, the Ten of Hearts may be moved on to the Jack of Diamonds.

If a row becomes empty, any available card may be moved into the space. Hence it is possible to move cards back and forth between rows in order to get at those cards which are needed to build on to the bases.

SC

AMIGA COVER DISC

Win up to £1,000!

WE are always looking for original contributions for the *Amiga Computing* cover disc. If you think something you have written is good enough to share with everybody else who reads the magazine, send it along and we'll have a look.

If we like what we see, it could earn you up to £1,000.

Please let us know which files, if any, your submission needs from the Workbench disc. If it is clickable, feel free to design an original icon. But don't make it too large. And please use the standard Workbench colours.

Bear in mind that a program which does not run on a 512k machine would have to be exceptionally good to make it on to the disc.

Amiga Computing will buy your work on an all rights basis. We are not prepared to pay for programs which are already in the public domain or have been spread by other means. However we are quite prepared to launch your program into the public domain as either freeware or shareware if that is what you wish.

Please enclose this coupon, or a photocopy of it, with your submission. Include a file on the disc with full documentation, your name, address, phone number and a few details about you and your kit. A photograph of yourself would be nice, but isn't essential.

Don't forget to duplicate on the disc label the program name, your name, address and phone number. If you want your disc back, enclose a self-addressed, stamped envelope.

Name ....Age..........years
Address ....
....
....
Daytime phone..After ....am
Evening phone..After.......... pm
Submission name ....
Submission size....................bytes in total

We will accept submissions up to 500k in total length, including documentation. But the shorter your submission, the better chance it stands of getting on to the disc. If it is a compiled or assembled program include all the source code, but do not count this in the size of the submission. Write a brief description of your submission below. If it consists of more than one file, describe what each file is for. Attach an extra sheet of paper to this form if necessary:

....
....
....
....
....
....

Sign this declaration:

The stuff on this disc is mine. I didn't nick it off someone else. It hasn't been published before and I haven't submitted it elsewhere because I want *Amiga Computing* to publish it.

Signed .... Date ....

Post your submission to: Amiga Computing, Cover Disc Submissions, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP

NON-SUBSCRIBERS

If you bought your magazine in a shop and when you got home you found your disc was damaged, please return it, **within two months of the on-sale date of the magazine,** to:

Amiga Cover Disc, Stanley Precision, Unit F, Cavendish Courtyard, Sallow Road, Welldon North Industrial Estate, Corby, Northants, NN17 1JX.

You will be sent a new disc with our compliments. Please allow 28 days for delivery.

Citadel

THE entire pack is shuffled and the side columns are dealt as in Beleagured Castle. Whenever an Ace appear s during the deal it is placed in the centre column as a base.

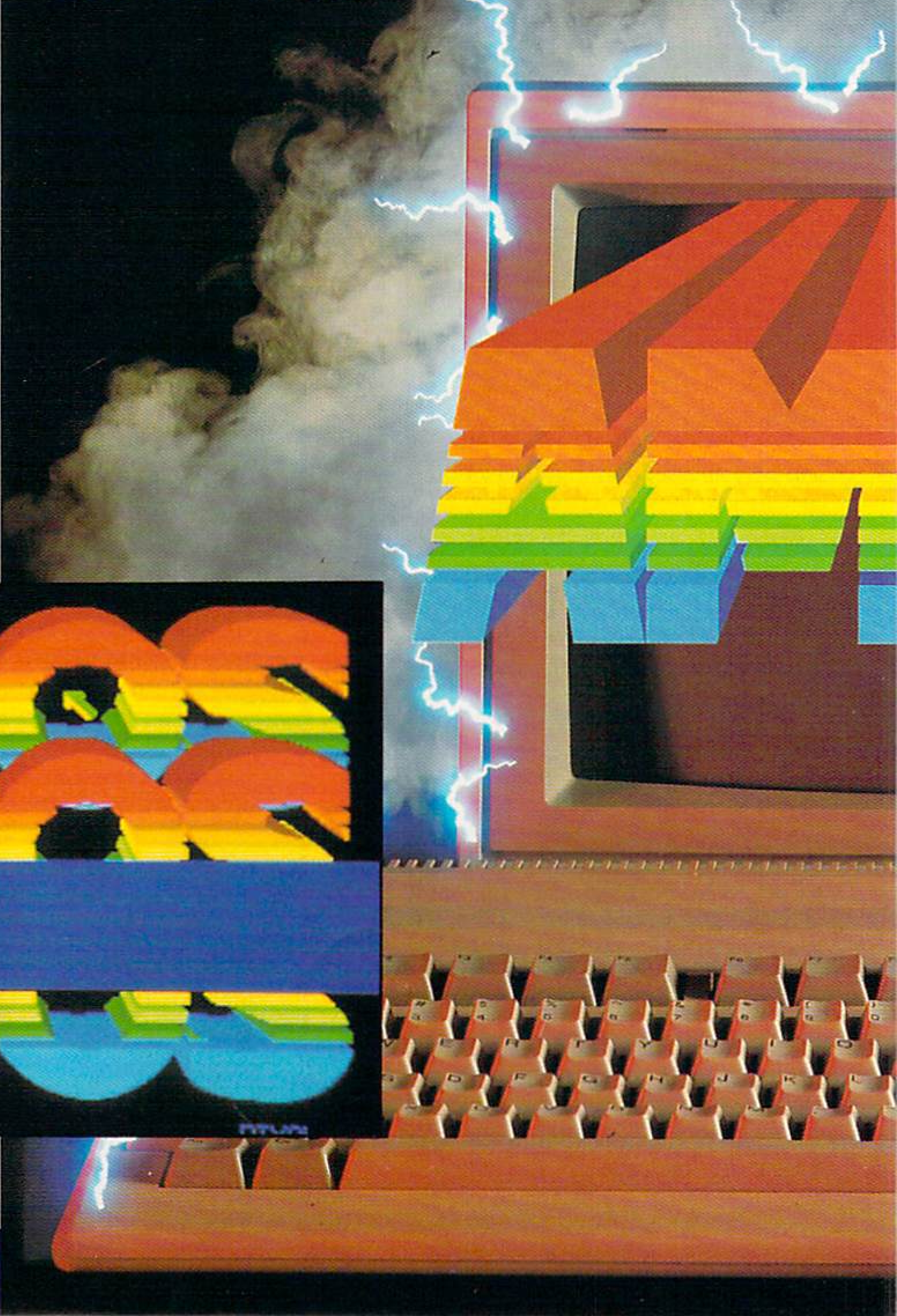
As the deal continues, other cards of that suit are built on to the Ace in ascending sequence. This means that when the deal is finished, it is possible that the number of cards in certain rows will be reduced, which makes Citadel the easiest of the three games to win.

Streets and Alleys

THIS is a harder variant of Beleaguered Castle. The entire pack is shuffled and dealt in the usual rows, but with seven cards in the four rows on the left. As they become available during play the Aces can be placed in the central space as bases. The remaining cards are built on to them as in Citadel and Beleagured Castle.

Amos

Fed up with Amiga Basic? Feel held back by the restrictions of the alternatives? Jeff Walker previews a Basic language that breaks all the rules and runs like the wind



A NEW programming language is about to be released for the Amiga which Mandarin Software, the publisher, believes is going to revolutionise and simplify the creation of commercial quality games on this wonderful machine of ours. The language is called Amos.

It is a re-write – and that word is important – of STOS, the Basic-like language for the Atari ST.

It is neither a conversion nor a port, STOS programmer François Lionet has re-written Amos on the Amiga from scratch. And it shows.

One look at the Amos demo program – always remembering that what you are viewing is being interpreted, like Amiga Basic, line by line – is enough to convince even the most hardened Amigaphile that while Amos may not stick to Commodore's programming guidelines for the Amiga, this is no ST port. Your jaw will sag – well, mine did anyway – as a succession of Amos logos and sprites slide and scroll over the screen almost as greasily and quickly as in any machine code demo.

Amos's power comes from its repertoire of more than 400 different functions and commands – so many that thinking up meaningful names for some of the more obscure keywords has given François and the rest of the development team the odd sleepless night.

It seems that Amos has a command for every occasion. If you can imagine for a moment a hypothetical language that instead of having a single "Wiggle Toes" command had "Wiggle Little Toe Left Foot" and "Wiggle Big Toe Right Foot", then you'll be pretty close to imagining the depth of Amos Basic.

The command list is bewildering and impossible to hold in your head – which will make a good reference manual, as well as a tutorial, an essential part of the package.

The documentation is at this very minute being written by Stephen Hill, the same person who wrote the STOS manual, so we can be sure that the author knows the basics of the language, even if he may not know the Amiga.

Everything Amiga Basic has, Amos has, although not in a form that is immediately compatible. On top of this, Amos has commands that will make even GFA Basic owners turn green with envy – like the memory bank commands.

Amos has functions to manipulate bobs, sprites and music. The data needed by these functions has to be stored along with the program. For this purpose Amos uses a special set of 15 sections of memory, which it calls banks.

These banks aren't the areas of fixed amounts of bytes that some 8 bit computers work with, rather they are user defined reserved areas of memory. Amos calls them banks, but they aren't true banks – indeed bank technology is alien to the 68000 processor.

Amos's banks are just an easy way of getting data into ram – chip or fast – and addressing it. Instead of working with start addresses and lengths of data, you work with bank numbers. There are two types of memory bank, permanent and temporary. Permanent banks need only be defined once and are saved along with your program automatically; temporary banks can be erased and are re-initialised every time a program is run.

The host of commands relating to banks is topped off by one to transfer the entire contents of one bank to another.

Programs in Amos are typed or loaded into its integrated full screen text editor. This editor is the Achilles' heel of the whole system. Quirky and unAmigalike, it insists, like the GFA Basic editor, that programs be typed in the way *it* wants you to type them in.

It parses and tokenises each line after you press Return, which is a Good Thing, and reports – and sometimes removes! – any error it finds, placing the cursor on the end of the word that appears to have caused the breakdown in communications.

The blank line, the age-old friend of structured programming in languages like Amos that don't use line numbers, is banned, though Rem statements can be inserted to break the code into logical and eye-sized chunks.

There are no pull down menus in the Amos editor. Each function is chosen, again like in the GFA Basic editor, by clicking on buttons. The buttons are large and there is only room across the top of the Amos screen for a double row, comprising 10 in all. By holding down the right mouse button another menu of 10 can be accessed. Clicking on buttons like Block Menu or Search Menu results in 10 more buttons each.

Luckily there are some hot-key shortcuts. Holding down the Ctrl key displays the block menu, holding down the Shift key displays the files menu, holding down the Alt key displays the search menu.



The direct mode window can be re-sized and moved up and down

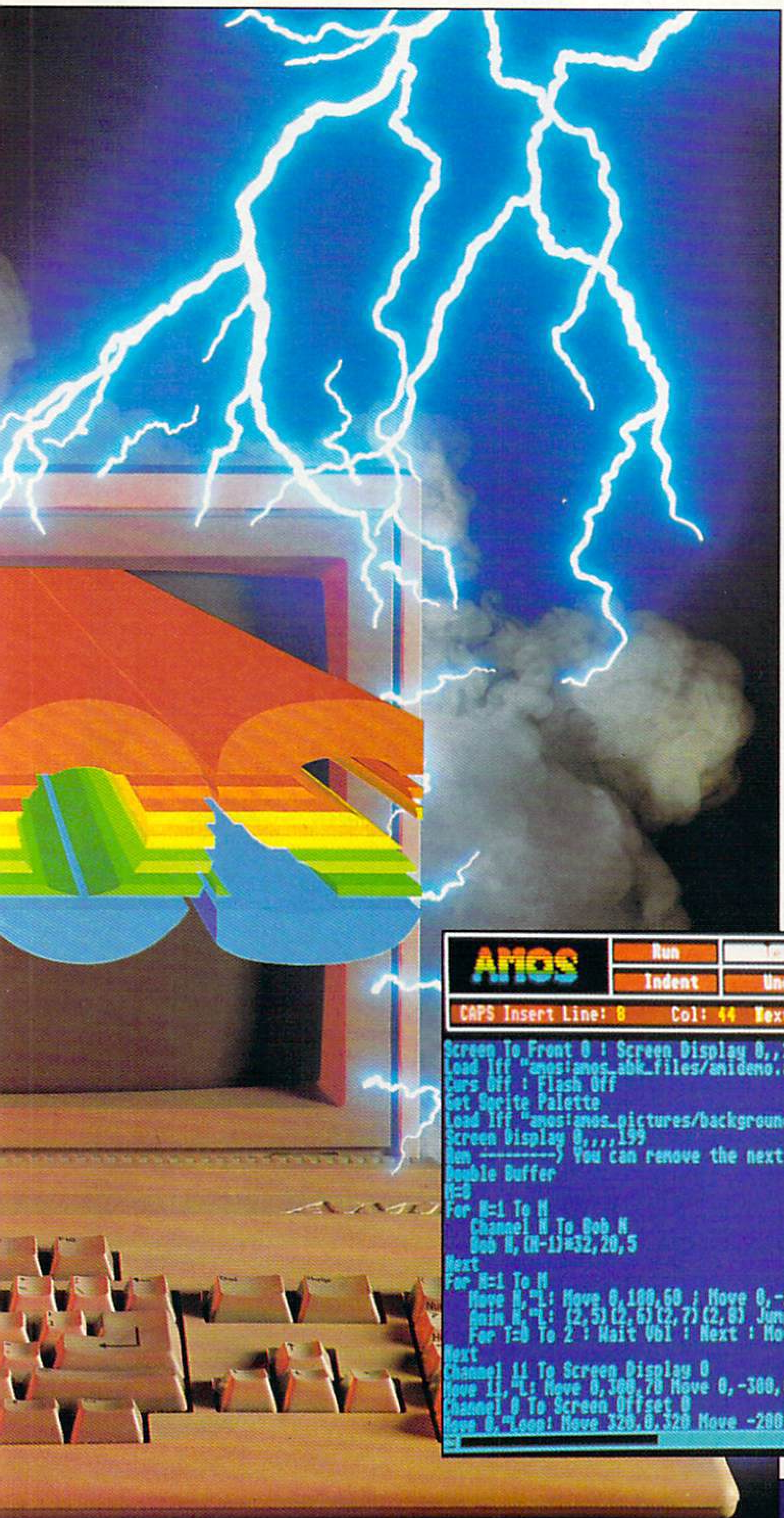
Buttons can then be selected by pressing F1-F5 for the top row, F6-F10 for the bottom row.

Although this type of user interface will be strange to Amiga owners, it does work very well and once you get used to it, it's certainly better than taking your hands off the keyboard to push the mouse around. The file requester used by the files menu is, like the rest of Amos, not quite what Amiga owners are used to.

But it's friendly, knows about devices – logical and assigned – and is totally mouse operated. Above all it's quick, it's solid, and it will do.

Like Amiga Basic and GFA Basic, Amos saves programs in its own tokenised format. You do have the Save Ascii option though, which is just as well because if you want to merge subroutines or lines of data into your program, the file you need to merge in must be Ascii format.

amour



Back in the editor you can set up 20 macros, which are accessed by pressing one of the function keys while holding down the left or right Amiga key. Storing common commands like *Screen Open* and *Screen Display* in these macros will save time when developing programs.

Experienced programmers are going to feel at home with Amos. Many commands are deliberately low level, allowing you to modify copperlists, rotate, test and set bits. Plus, of course, you can poke and peek bytes, words and longwords.

If after learning the language you decide that the commands you want are not in the syntax, then get out your Devpac and write them, Amos will let you tack them on to the command list as an extension.

Up to 26 extensions are allowed, a couple will be provided with the package to give you extra 3D and music-handling routines. Alternatively, do the twiddly bits in Amos, write the bit that needs speed in assembly, then load the machine code into a bank and call it up when required.

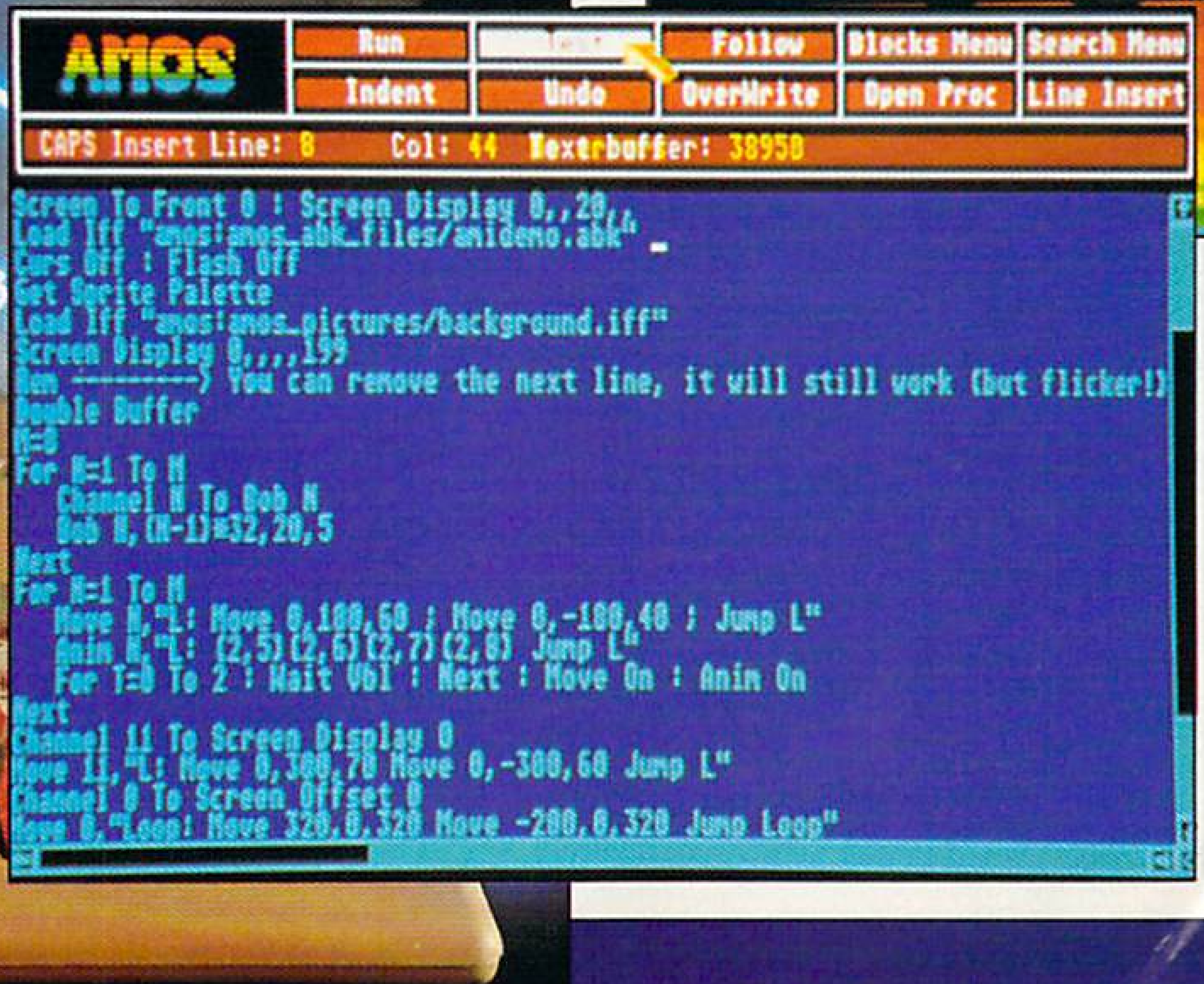
You will be able to hold up to four Amos programs in memory at once. Pressing the Help key will present you with a sort of file requester which will allow you to swap between programs.

As well as the four Amos programs, and depending on available ram, you will also be able to hold as many Amos accessories in memory as you like.

These accessories will be programs like the Amos sprite, and music editors, themselves written in Amos Basic. You will be able to launch any one of them while still within Amos itself, and swap between either two accessories or ➤



Screens and sprites galore – in 32 colours as well!



The Amos editor, the product's only weakness


KICK OFF 2
ANCO
MAY RELEASE
AMIGA - ATARI ST - IBM PC
CBM64 - SPECTRUM - AMSTRAD
ANCO SOFTWARE LTD., UNIT 10, BURNHAM TRADING ESTATE ROAD,
DARTFORD, KENT. Telephone No.: 0322 92513/92518. FAX No.: 0322 93422.

one accessory and your program under development. Where possible, Amos and the accessory will work together for the common good – for instance, sprites being designed in the sprite editor will be instantly accessible to the program under development in Amos.

Not everything Amos does is anti-establishment. It knows about fonts, it knows about devices, including RAM: and hard drives, it knows about the IFF standard for graphics, and although Amos itself doesn't utilise pull-down menus, Amos Basic has the usual array of menu and submenu commands which will allow you to write them into your programs.

In fact, Amos Basic takes menus a step further by allowing menus to be placed anywhere on the screen, allowing them to be moved by the user, and allowing the programmer to use bobs in them. This has to be seen to be believed.

Sprites are the heart of any arcade game, and Amos gives you the power to control both hardware and software flavours (bobs) totally. The commands which



Sprites in pull-down menus? Oh my word!

A programmer's tale

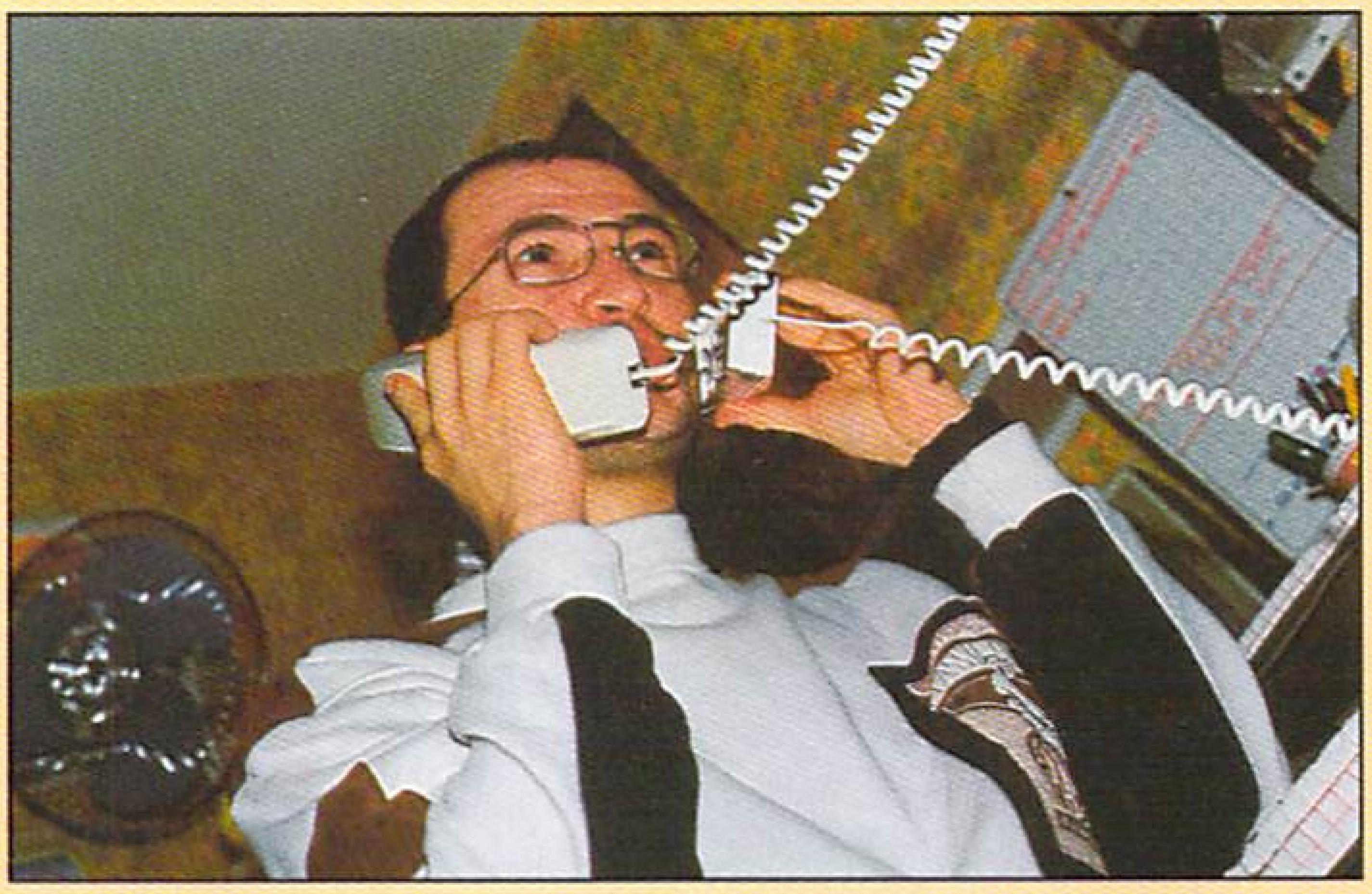
FRANÇOIS LOINET finished writing STOS in 1988. The obvious next step was an Amiga conversion, and work on this was already underway early in 1989. He was new to the Amiga, and was eager to learn all about it so he could make Amos an even bigger success than its older brother.

It didn't take François (pictured right) long to see the light. "I'm not an ST programmer any more", he proudly brags. "Who could remain an ST fan when he has an Amiga as well?"

It took him a little longer to get used to Intuition, but now he loves that too. Except for the windows. "The idea of making an environment that looks the same for everything is good," he agrees, "but I find the Intuition window a little sad. It doesn't look *nice*".

Like plenty of others, he hates AmigaDos. "It really is the worst disc operating system I know", he moans. "It's full of good intentions like making disc access safer, but the result is not as good as the ambitions are high".

So if François is such a fan of



Intuition, why has he not used it to program Amos with? Why has he used his own screen system?

"I agree it would have been much easier to program", he says, "but Intuition windows are desperately slow. What I really wanted was an editor window and a command window independent from the program area. Take a look at Amiga Basic to get an idea of how my editor would have looked using Intuition windows.

"With my own screen system, all these graphic outputs are truly independent – and it is *very* fast. The file requester, for instance, uses its own screen. It will remain the same whatever the resolution of the graphics used in your program.

"I would have saved months if I had used Intuition, but then Amos would not have been as fast as it is."

What about multi-tasking? All the development versions of Amos I have seen forbid you from multi-tasking with other programs. Isn't this a considerable restriction for an Amiga application?

"Amos does multi-task!" François retorts. "It is a clean program, I really respect everything in the Amiga. I even open one Intuition screen to use its rastport for my graphics output. Writing a language you could not quit from would have been suicide – the system is intact when you leave Amos".

I showed François an early draft of my preview, which laid into Amos because it wouldn't let you access Workbench or AmigaDos while it was running. I was extremely surprised by his reaction.

"Your article has pushed me to take a very big decision", he told me after reading it. "I will make Amos multi-task. I was wondering whether to do it or not, and your article has made me take the plunge. Now when Amos is merging-in and tokenising an Ascii file you will be able to use Protext!"

The icing has been put on the cake. Now where did I put that cherry...?



Sigh. Yet another file requester design to get used to

Animation on interrupt

HIDDEN inside Amos is Amal, the Amos Animation Language. With it you can animate and move screens, sprites or sequences of sprites. You can check the state of the joystick and mouse, the positions of sprites and detect collisions.

Amal speeds up anything that moves on the screen, but tell it to do something stupid and it will react unpredictably. So the package includes an Amal Editor accessory which will allow you to write and test chunks of Amal code before committing them to the program proper.

The Amal commands are stored in strings. Because Amos knows where in memory those strings are stored, when presented with a command like *Move 1,S1$: Move 0,S1$: Move On* it can start an interrupt which jumps every 50th of a second to the start addresses of the strings and execute the commands it finds there. Meanwhile the interpreter can work on the rest of your program.

The listing below illustrates the power of Amal and the ease with which it can be used. When run, the program will load an IFF screen called MyPicture and scroll it vertically, like a TV with its vertical hold gone wrong. Once past the *Move On* command the program just sits and waits in a Repeat loop for the right mouse button to be pressed, it could equally well do anything else you wanted.

```
Screen Close 0
Load Iff "MyPicture",0
Screen Display 0,,,,320
Screen Clone 1
View
Channel 0 To Screen Display
0
Channel 1 To Screen Display
1
Rem -------------
Rem Start of AMAL program
Rem -------------
S1$="Screen: Let Y=0;"
S1$=S1$+"  Move 0,-320,50;"
S1$=S1$+"  Let Y=320;"
S1$=S1$+"  Move 0,-320,50;"
S1$=S1$+"  Jump Screen;"
S2$="Screen: Let Y=320;"
S2$=S2$+"  Move 0,-320,50;"
S2$=S2$+"  Let Y=0;"
S2$=S2$+"  Move 0,-320,50;"
S2$=S2$+"  Jump Screen;"
Rem -------------
Rem  End of AMAL program
Rem -------------
Amal 1,S1$ : Amal 0,S2$ :
Amal On
Repeat
Until Mouse Key=2
```

➤ manipulate sprites are similar to the ones in Amiga Basic, except there are more of them and they are much more powerful.

The only real restrictions in Amos Basic are those imposed by the Amiga itself, and while sprite movement isn't as fast nor as smooth as those moved by pure machine code, it is easily as fast, maybe faster, than those examples I have seen of sprites being moved in C.

Once the Amos Basic Compiler appears, which shouldn't be too long after the interpreter, further speed improvements will be available.

Amos Basic is intended for writing games, indeed it is billed as The Game Creator, which is why nothing written in it will multi-task. Games don't need to multi-task, says the programmer, and he is probably right.

The shame of it is that Amos is perfect for writing applications and utilities as well – the Amos accessories are proof enough of that – but, say the purists, applications on the Amiga *must* multi-task. If a latter day Moses was to climb Mount Sinai he'd find another stone tablet up there now; and carved on it would be: "Thou *shalt* multi-task on thy Amiga."

So as far as applications and utilities are concerned, Amos is only useful for writing accessories to help with the development of Amos Basic programs. I can think of a few – a new text editor is top of my list, followed by an on-line help program, a comprehensive graphics package, a sampler, machine code assembler... I could go on for quite a while. Clearly, there is plenty of mileage on the applications writing front.

I've been following Amos from its infancy. In those days it was a rough STOS-like shell. I've watched it grow, watched most of those ideas come to fruition, watched it being twisted and tweaked until it purrs.

I was excited about it when I first saw it, I'm excited about it still. No other Basic on the Amiga can hold a candle to it. But don't take my word for it – search out the advert, cough up two quid for the demo disc and see for yourself.

REPORT CARD

AMOS – The Game Creator
Mandarin Software
0625 859333
£49.95

EASE OF USE.........
The editor will take more than a bit of getting used to, but otherwise it's plain sailing all the way.

SPEED ....
Whoosh! By far the fastest Basic interpreter on the Amiga. Nobody will ever top it.

VALUE....
Cheap at twice the price. No programming language gives you more for your money.

OVERALL 94%

Amos Basic is surely destined to become symbiotic with the Amiga. Programming in Basic will never be the same again.

ALL OUR PRICES INCLUDE CARRIAGE & VAT

HSV COMPUTER SERVICES LIMITED (AMC)
23, Hampstead House, Town Centre, Basingstoke, RG21 1LG.

3 1/2" DS/DD Disks Bulk - Fully Guaranteed

25	50	100	250	500	
*69p	*63p	*61p	*59p	*57p	*per disk

SONY 3.5" DS/DD branded discs £13.95 per box of 10

Lockable Disk Boxes
50 x 3 1.2" £5.95
100 x 3 1/2" £7.95

Special Box and Disk Offer
100 capacity disk box only £4.95 when purchasing 50 or more disks

Stationery... Stationery... Stationery...

Micro-perf all edges	500	1,000	2,000
9.5" x 11" 60gsm		£9.50	£15.95
True A4 70gsm	£8.50	£12.95	£23.95
True A4 80gsm	£8.95	£13.95	£25.95
True A4 90gsm	£9.75	£14.95	£27.95

Accessories
3 1/2" Cleaning Kit £4.95
Amiga 500 Dust Cover £4.95
Amiga 1000 Dust Cover £9.50
Mouse Mat (Foam) £5.95

Labels	1,000	2,000	4,000
3.5" x 1.5" (1 across)	£5.25	£9.50	£17.95
3.5" x 1.5" (2 across)	£5.75	£10.50	£19.95
4.0" x 1.5" (1 across)	£5.75	£10.50	£19.95
4.0" x 1.5" (2 across)	£5.75	£11.95	£22.95
2.75" x 1.5" (3 across)	£4.75	£8.50	£15.95

Ribbons
Canon PW1080 .... £2.95
Citizen 120D £3.95
Epson FX/MX/RX80 ..... £2.95
Epson LX80/86 .... £2.50
NEC P2200 .... £4.95
Panasonic KXP 1080 ... £3.95
Panasonic KXP 1124 ... £4.95
Star LC10 (Mono) £3.95
Star LC10 (Colour) £7.95
Star LC24-10 .... £4.95

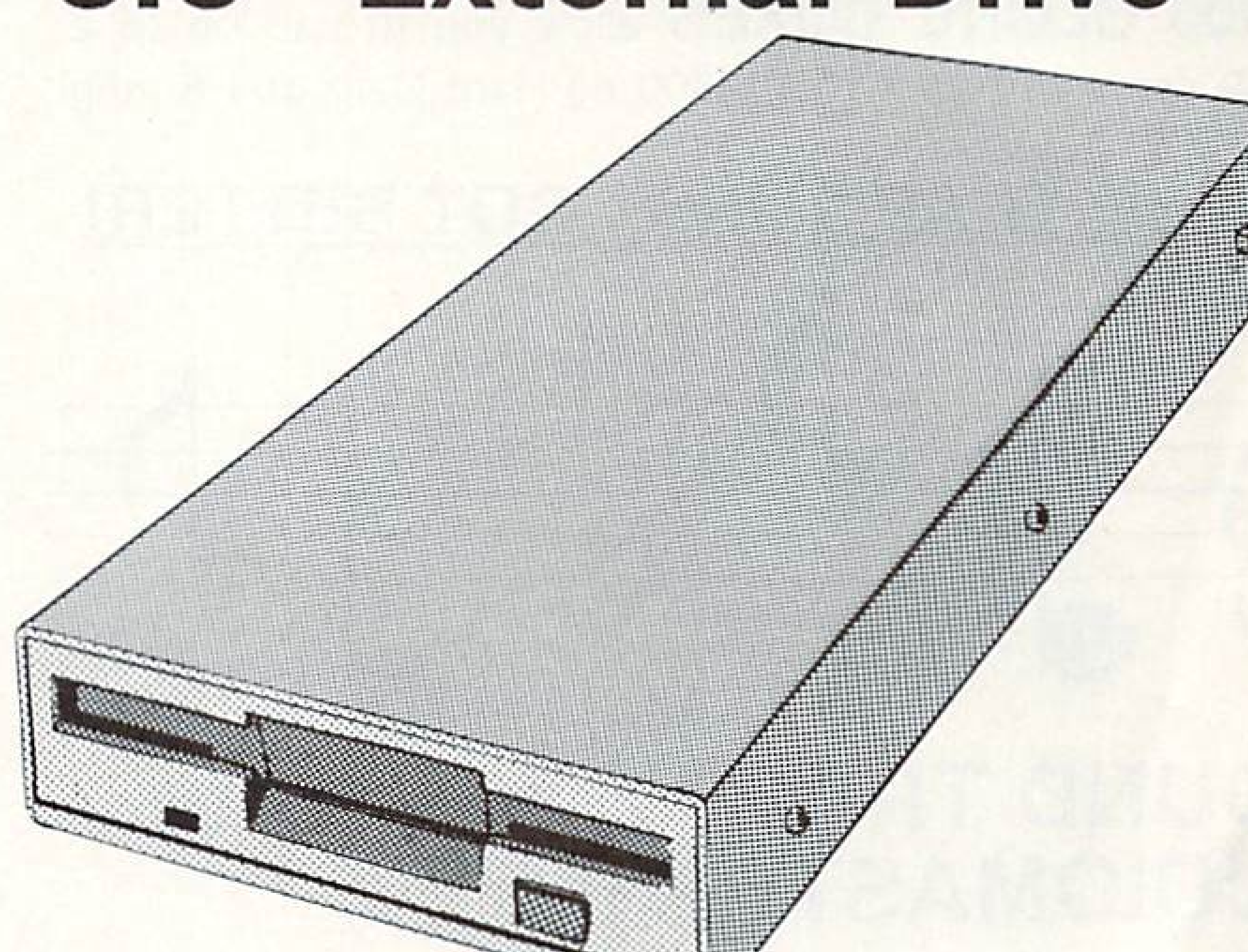
TWO AMIGA SPECIALS

Amiga 500 upgrade board .5 to 1 Meg . . . In seconds!

★ No technical expertise required
★ Realtime Clock
★ Low power consumption
★ On/off switch

ONLY £72.95
inc VAT + Delivery

3.5" External Drive



★ Suitable for Amiga 500/ 1000/2000
★ NEC drive mechanism
★ Can be daisy chained
★ Integral power supply
★ Ultra slim metal case
★ Enable/disable switch
★ 12 months warranty

ONLY £72.95
inc VAT + Delivery

STOP PRESS – BUY BOTH ITEMS £139.95

Access

Order Hotline (0256) 463507
Orders under £8 in value carry a small order charge of £2

VISA

BYTES & PIECES ™

2000 'SLOT MACHINE' ™

For the 2000 with auto-booting and driver software. Ready formatted. Can be a hard card or with drive mounted in a drive bay or in an external case. Your choice. (We can provide just the interface if you provide the ST506 drive). Uses the OMTI cache memory card that is **RAPID!** Read speeds near to 500K a second are possible. **We can sell you a 40 meg system for £450** plus carrage but for the serious user we recommend the very latest drive, **a 66 meg 3.5 inch 24 mill/sec access drive that you can hardly hear running and at £599 it is a steal.** Don't forget, with our systems you double the capacity by the purchase of a second drive only! Highly recommended by **AMIGA USER INTERNATIONAL** and **17 BIT SOFTWARE**

A500/A1000 HARD DRIVES

Exactly the same specification as above but obviously external mounted in a fan cooled case that can take two half-height drives or one high-tec full height drive. These drives are not a toy 20 meg but for the serious user/hobbyist. Even 40 megs is sometimes not enough but one will cost you **£499** plus carrage but try to start with the 66 meg at **£625 for rapid mass storage.** We have larger capacity drives.

B2000 CLONE BOXES allow you to use up to 2 B2000 cards in your A1000/A500 eg Hard Card and 8 meg board **£99**

SOUND TRAP 3 JUST GOT BETTER!



SOUND TRAP™ 3 now with AUDIOMASTER II

THE BEST HARDWARE AND THE BEST SOFTWARE for all AMIGAS to give superior soundsampling. ST3 and Audiomaster 2 £59.95 all inc. ST3 on it's own still £37.50 AUDIOMASTER 2 £25 TO ST3 USERS SONIX £25 INC BABY MIDI INTERFACE THE SIZE OF A SMALL PRINTER PLUG. IN--OUT--PASS THRU' £27.50

2MEG BOARD

A500 memory board uses low power CMOS chips as 512k, 1 meg or 2 meg. Transparent auto-configure. No leads or jumpers, multi-layered board, buffered at **£299** for 2 megs

1.5MEG BOARD

A1000 memory board with clock, can autoconfigure 512k 1 meg & 1.5 meg software ram test disk 1.5 megs **£270**

OCTABYTE™ 8MEG - 2000

For the 2000 and the new **AX-S** expansion system.
With a ram controller chip for contiguous ram not fragmented! Software support disk tests ram. The latest technology, not a board a few years old. **2 megs £299 8 meg £799**

X-RAM™ 8MEG - A500-A1000

The same as 'OCTABYTE' but in a slimline case with optional power supply..

£335 for 2 megs

X-RAM can be used in your 2000 when you upgrade

SPECIAL

'IT CAME FROM THE DESERT'--ONE MEG GAME
PLUS
512K *SPIRIT* RAM BOARD WITH CLOCK
£74.99
ALL INCLUSIVE

WE HAVE THE BEST PRICE ON 512K A500 EXPANSIONS

WE ALSO INCLUDE A UTILITIES DISK TO RESET THE CLOCK HIT BY A VIRUS AND KILL FAST MEMORY (NO NEED FOR SILLY SWITCHES NOW)

INTERLOCK™ GENLOCK £399

X-COPY 2.1 inclusive of postage £17.50

HARDWARE £17.50 Upgrades £3.50 (Send your disk)
HARDWARE & SOFTWARE £29.95 all inclusive

FULL B2000 SYSTEMS

We can now supply the B2000 & Fatter Agnus at £795 plus VAT. We can also supply HARD DRIVES, BRIDGEBOARDS, ACCELERATOR CARDS, COLOUR MONITORS, 8 MEG BOARDS, in fact almost anything or any configuration you want. Call us for a quote. We will shortly be operating Commodore's new offer of getting £300 back on your A500 against a B2000
MORE DETAILS ARE AVAILABLE IN OUR BROCHURE AS WELL AS A COMPREHENSIVE ARTICLE ON ALL YOU NEED TO KNOW ABOUT HARD DRIVES & MEMORY. REQUEST IT NOW!!

BYTES & PIECES, 37 CECIL STREET, LYTHAM, LANCS, FY8 5NN, UK
Tel 0253-734218 Fax 0253-714141 ON-LINE Support number available

MasterCard VISA

Callers by appointment please. Open 11am to 6pm Monday to Friday Prices include VAT

We are the Official Spirit Technology distributors and manufacturers.
Dealer enquiries welcome from the UK, Scandinavia and Northern Europe.

Another Abacus corker

BOOK REVIEW

Title: Advanced System Programmer's Guide for the Amiga

Authors: Bruno Jennrich, Wolf-Gideon Bleak, Peter Shultz

Publisher: Abacus

ISBN: 1-55755-047-6

Price: £29.95 (554 pp, paperback)

NOW established as the leading publisher of books for the Amiga, Abacus has added a further gem to its range – the Advanced System Programmer's Guide for the Amiga, a heavyweight edition co-authored by Bruno Jennrich, Wolf-Gideon Bleak and Peter Shultz.

The first two chapters provide a gentle introduction by offering some notes on programming style and general Amiga programming conventions.

These are followed by a useful chapter on parameter passing via the CLI and an in-depth examination of the way programs operate under the Workbench environment. This last topic is well explained, and covers both the .info file and the use of the icon library routines.

As might be expected, the section on devices is fairly hefty. Parallel and serial devices, keyboard, timer and gameport devices are all well covered.

The text and examples dealing with the use of the trackdisk and audio devices deserve a special mention because there are plenty of good tips, many of which you are unlikely to read about elsewhere, and the examples are a potential goldmine for the serious programmer.

The chapter on IFF files is possibly the only part of the book which seems a bit mundane. Much of the information offered is already very well known in Amiga circles and little extra help has been offered.

Towards the end of the book comes the large section documenting the extensive Amiga library functions. The listings cover the functions, their purpose, and details of the parameters required. Best of all, it is up to date for version 1.3 of the system software.

Other chapters offer help with such things as font creation, keymap use, and writing your own printer drivers, so this new book is going to be extremely useful.

Paul Andreas Overaa

Chaos

...weather you like it or not

From weights swinging on strings to clouds brewing over the Atlantic, chaos ties together all kinds of unrelated irregularities. Alastair Scott presents part two of his series on this revolutionary new science

```
'
' Shows the behaviour of 3 pendula.
'
  SCREEN 1,640,256,3,2
  WINDOW 1,"Three Pendula",(0,0)-(631
,242),0,1
  DEFINT a,c
  DIM SHARED ynew(5),k1(5),k2(5),k3(5
),k4(5)
  PALETTE 0,0,0,0
  PALETTE 1,.33,.33,.33
  PALETTE 2,1,1,1
  PALETTE 3,1,.53,0
  PALETTE 4,1,0,0
  PALETTE 5,1,1,0
  PALETTE 6,.17,.17,.17
  MENU 1,0,1,"Options"
  MENU 1,1,1,"Restart program"
  MENU 1,2,1,"Quit program   "
  FOR a=2 TO 4:MENU a,0,0,"":NEXT
  ON MENU GOSUB choice:MENU ON
  WHILE TIMER
    CLS
    COLOR 2
    INPUT "Parameter for simple pendu
lum? (0-1) ",param1
    INPUT "Parameter for Van der Pol?
 (0-4) ",param2
    INPUT "Parameter for Duffing? (0-
1) ",param3
    endflag=0
    xcoord=0
    t=0
    y(0)=.5
    y(1)=.03
    y(2)=.5
    y(3)=.03
    y(4)=.01
    y(5)=.01
    CLS
    WINDOW 2,"Linear pendulum",(10,19
0)-(210,240),0,1
    WINDOW 3,"Nonlinear pendulum",(21
5,190)-(415,240),0,1
    WINDOW 4,"Chaotic pendulum",(420,
190)-(620,240),0,1
    WINDOW OUTPUT 1
    FOR a=20 TO 150 STEP 65
      LINE(0,a)-STEP(632,0),6
    NEXT
    WHILE NOT endflag
      RungeKutta y()
      WINDOW OUTPUT 1
      PSET(xcoord,20+35*y(2)),4
      PSET(xcoord,85+15*y(0)),3
      PSET(xcoord,150+15*y(4)),5
      WINDOW OUTPUT 2
      pendulum y(2)*3!,4
      WINDOW OUTPUT 3
      pendulum y(0),3
      WINDOW OUTPUT 4
      pendulum y(4)*3!,5
      xcoord=xcoord+1
      IF xcoord=632 THEN
        WINDOW OUTPUT 1
        CLS
        FOR a=20 TO 150 STEP 65
          LINE(0,a)-STEP(632,0),6
        NEXT
        xcoord=0
      END IF
      t=t+.1
    WEND
    WINDOW OUTPUT 1
    WINDOW CLOSE 2
    WINDOW CLOSE 3
    WINDOW CLOSE 4
  WEND
```

Listing I

PENDULA are horrid things. At school they are boring and an inexhaustible source of examination questions which put you off them very quickly. This is a great pity. As usual, teachers never tell you the whole truth, and certain pendula exhibit the signs of chaos very clearly.

Take a look at Listing I, which, when run, shows three of the villains oscillating away and displays their displacements with time at the top of the screen.

The first pendulum is a simple one with friction opposing the motion, causing oscillations to die away. What you aren't told in school is that the equation which governs its motion is fiddled to make it linear – the sine of the angle the pendulum makes with the vertical is replaced by the angle itself, so that you can write down a solution to the equation.

With the sine present, the equation is nonlinear; there is no exact solution, so a computer must be used to solve it numerically.

The linear equation is valid for small oscillations only – a few degrees from the vertical at most – the nonlinear equation for any size of oscillation. Putting the parameter equal to zero gives an undamped pendulum, which oscillates for ever. This is completely unrealistic and never happens in nature, despite what you may have been told.

The second pendulum is known as the Van der Pol oscillator. Strictly speaking it is an obscure electrical oscillator, but journalistic licence has made me turn it into a pendulum or mechanical oscillator so that you can see and understand its motion.

Notice the strange behaviour, which is the reverse of the simple pendulum – velocity is greatest at the extremities of the motion. Putting the parameter equal to zero again gives you the simple pendulum. No chaos yet; keep reading.

SUPPOSE you apply a driving force by shaking the linear pendulum mounting up and down with a given frequency. When you find the correct frequency you will notice the amplitude of motion increasing with time. This is resonance. Resonance has caused badly designed machinery to fly apart.

If you shake the nonlinear pendulum mounting, chaos – at last! – appears. The third pendulum demonstrates this. It is a nonlinear system known as the Duffing oscillator, driven as before. It is a mathematical model of a flexible metal strip suspended between two powerful magnets.

For low values of the parameter – less than 0.1 – the strip remains in the vicinity of one of the magnets. As the parameter passes through 0.1, the strip suddenly starts whipping backwards and forwards. Above 0.11437, there is chaos – the strip can be near either of the magnets and there is no way of telling which one. The driven Van der Pol oscillator also exhibits chaos.

Nonlinearity is tremendously important, although it is furiously papered-over in text books and popular accounts of science because it usually leads to equations which cannot be solved by hand.

The Navier-Stokes equation, the lynchpin of fluid dynamics, is nonlinear, so nonlinear in fact that approximations have to be made before even the most powerful computers can solve it for simple situations.

Twenty-five years ago Edward Lorenz did a terrible hatchet job on the Navier-Stokes equation, turning it into a set of three equations in three unknowns, x, y and z, with three parameters a, b and c ... a=8/3 or 2.67, b=10 and c varies in Lorenz's original work.

Listing II solves these equations for x, y and z, displays the variation of x, y and z with time across the screen and plots x against y, y against z and x against z (phase plots) in the smaller window.

Two solutions are displayed in different shades of the same colour. The second solution has the initial values of x, y and z different by about one part in 100 from the first.

Lorenz solved these equations on an analogue computer – modelling equations by altering electrical components – called the Royal McBee LGP-30. He was ahead of his time because most scientists distrusted computers until at least 10 years later. What he found shocked him. But at first nobody took any notice.

With a=2.67 and b=10, Lorenz (and my program) worked out a critical value of c which is roughly 25. Try c=22 – you will see that x, y and z oscillate to start off with but that the oscillations die out.

Try c=30 and unexpected things happen. The oscillations gradually build up, then the two solutions suddenly go in completely separate and unpredictable directions. Increase c even further and the oscillations build up even quicker.

Remember the two signs of chaos as discovered by Poincaré:

- Even if the system seems orderly, you may get completely random results which cannot be predicted.
- Change the initial conditions slightly and the final result is enormously different.

They are both seen in these solutions. Lorenz, completely unaware of Poincaré's work, wrote a paraphrase: "Certain ... systems may exhibit either periodic or irregular behaviour when there is no obviously related periodicity or irregular

```
SUB pendulum(y,colour)STATIC
  CLS
  xend=100+20*y
  LINE(100,0)-(xend,45),1
  LINE(xend-4,43)-(xend+4,47),colour,
bf
END SUB

SUB RungeKutta(ya())STATIC
  SHARED param1,param2,param3,eps,t
  oscillate ya(),k1()
  FOR a=0 TO 5
    ynew(a)=ya(a)+k1(a)*.1
  NEXT
  oscillate ynew(),k2()
  FOR a=0 TO 5
    ynew(a)=ya(a)+k2(a)*.1
  NEXT
  oscillate ynew(),k3()
  FOR a=0 TO 5
    ynew(a)=ya(a)+k3(a)*.2
  NEXT
  oscillate ynew(),k4()
  FOR a=0 TO 5
    ya(a)=ya(a)+(k1(a)+2*k2(a)+2*k3(a
)+k4(a))/30!
  NEXT
END SUB

SUB oscillate(yy(),deriv())STATIC
  SHARED param1,param2,param3,eps,t
  deriv(0)=yy(1)
  deriv(1)=-yy(0)-param2*yy(1)*(yy(0)
*yy(0)-1)
  deriv(2)=yy(3)
  deriv(3)=-yy(2)-param1*yy(3)
  deriv(4)=yy(5)
  deriv(5)=-.0154*yy(5)+yy(4)-4*yy(4)
*yy(4)*yy(4)+param3*COS(1.2199778#*t)
END SUB

choice:
  IF MENU(1)=1 THEN
    endflag=-1
  ELSE
    MENU RESET
    FOR a=1 TO 4:WINDOW CLOSE a:NEXT
    SCREEN CLOSE 1:END
  END IF
RETURN
```

A VIDI SPECIAL OFFER

SAVE £15

AMIGA COMPUTING

READER OFFERS

Thanks to a breakthrough by Rombo Productions in frame-grabbing technology, you can now produce good colour images quickly and cheaply with Vidi-Amiga and the VidiChrome colour software.

- *Take snapshots in 16 shades live from video*
- *Multiple frame store*
- *Dynamic cut and paste*
- *Full palette control*
- *Hardware and software control of brightness and contrast*
- *Compatible with all video standards*

"Vidi must be one of the most exciting peripherals you can buy for your Amiga" – *Amiga Computing, March 1990*











FULL PAL SCREENS

RRP £134.95
OUR PRICE
£119.95

While stocks last, use the form on page 113

➤

behaviour in the forcing system ... prediction of the sufficiently distant future is not possible by any method".

You will see that for $c>25$ the phase plots all have two lobes. The solution may spend some time circulating round the point at the centre of one lobe, then a different time around the other, and so on, with the times being completely unpredictable.

Such points, known as strange attractors, are another sign of chaos. A phase plot of the Duffing oscillator shows a pair of strange attractors.

Lorenz, a meteorologist, also noted that weather forecasting was, essentially, futile because, to start with, the atmosphere is chaotic on small scales. Any course on atmospheric dynamics will immerse itself in discussions of Rossby and Boussinesq waves. These are large scale structures – over 1,000 km long – in the atmosphere which change very slowly; anything smaller cannot be considered without introducing huge disturbances.

Lorenz named the Butterfly Effect after the double-lobed phase plots. If a butterfly decided to beat its wings in the Amazon basin, a thunderstorm could be set off in America a week later.

Secondly, to even consider modelling the atmosphere all sorts of assumptions have to be made. It is usually considered to have the same pressure at all heights and a constant temperature gradient, but both assumptions are not even approximately true.

Clouds and dust are a complete mystery. Nobody really knows how they affect the reflection and trapping of the sun's rays, hence all the uncertainty about prediction of the greenhouse effect and global warming.

> *'If a butterfly beats its wings in the Amazon, a storm could be set off in America'*

Thirdly, to solve the Navier-Stokes equation the Earth's surface has to be approximated by a grid of points. As Messrs. Mercator & Co., cartographers, first found, you can't fit a two-dimensional grid on to a sphere – it has either to be squashed at the equator or stretched at the poles.

Both result in over-emphasis of the weather at the poles. This is bad news, because we know what polar weather is like and we don't care too much for it.

Lastly, to make the grid small and shallow enough – each element 1 x 1 x 1 kilometre as opposed to the present 6 x 4 x 3 kilometres – and still obtain solutions reasonably quickly would require computers 10,000 to 100,000 times more powerful than those available now.

Given all these problems, it is miraculous that the Met Office, thanks to powerful supercomputers and all sorts of clever tricks to reduce the effect of the problems, can make reasonable predictions for three or four days ahead. Bar the odd hiccup, of course, such as hurricanes over England.

● *NEXT MONTH: Simulating populations, and how they grow or shrink.*

```
'
' Solves the Lorenz equations.
'
  SCREEN 1,640,256,3,2
  WINDOW 1,"The Lorenz Equations",(0,
0)-(631,242),20,1
  DEF FNrand=1+RND/100-RND/100
  DEFINT i
  DIM SHARED ynew(5),k1(2),k2(2),k3(2
),k4(2)
  PALETTE 0,0,0,0
  PALETTE 1,.33,.33,.33
  MENU 1,0,1,"Options"
  MENU 1,1,1,"Restart program"
  MENU 1,2,1,"Quit program   "
  FOR a=2 TO 4:MENU a,0,0,"":NEXT
  ON MENU GOSUB choice:MENU ON
  WHILE TIMER
    endflag=0:count=0
    PALETTE 2,1,1,1:PALETTE 3,1,.53,0
    CLS:COLOR 2
    INPUT "Value of a";a
    INPUT "Value of b";b
    COLOR 3:PRINT
    PRINT"Critical value of c is";b*(
b+a+3)/(b-a-1)
    COLOR 2:PRINT
    INPUT "Value of c";c
    FOR i=0 TO 2
      y(i)=FNrand
      z(i)=FNrand
    NEXT
    CLS
    WINDOW 2,"Butterfly Diagrams",(30
,40)-(600,200),6,1
    PALETTE 2,1,1,0
    PALETTE 3,1,0,0
    PALETTE 4,0,1,1
    PALETTE 5,.53,.53,0
    PALETTE 6,.53,0,0
    PALETTE 7,0,.53,.53
    WHILE NOT endflag
      RungeKutta y()
      RungeKutta z()
      WINDOW OUTPUT 1
      FOR i=0 TO 2
        PSET(count,50*(i+1)+2*y(i)),i
+2
      NEXT
      FOR i=0 TO 2
        PSET(count,50*(i+1)+2*z(i)+2)
,i+5
      NEXT
      count=count+1
      IF count=632 THEN
        CLS
        count=0
      END IF
      WINDOW OUTPUT 2
      PSET(75+4*y(0),54+2*y(1)),2
      PSET(250+4*y(1),24+2*y(2)),3
      PSET(425+4*y(0),24+2*y(2)),4
    WEND
    WINDOW OUTPUT 1
    WINDOW CLOSE 2
  WEND

SUB RungeKutta(ya())STATIC
  SHARED a,b,c
  lorenz ya(),k1()
  FOR i=0 TO 2
    ynew(i)=ya(i)+k1(i)*.01
  NEXT
  lorenz ynew(),k2()
  FOR i=0 TO 2
    ynew(i)=ya(i)+k2(i)*.01
  NEXT
  lorenz ynew(),k3()
  FOR i=0 TO 2
    ynew(i)=ya(i)+k3(i)*.02
  NEXT
  lorenz ynew(),k4()
  FOR i=0 TO 2
    ya(i)=ya(i)+(k1(i)+2*k2(i)+2*k3(i
)+k4(i))/300!
  NEXT
END SUB

SUB lorenz(yy(),deriv())STATIC
  SHARED a,b,c
  deriv(0)=-b*yy(0)+b*yy(1)
  deriv(1)=-yy(1)+c*yy(0)-yy(0)*yy(2)
  deriv(2)=-a*yy(2)+yy(0)*yy(1)
END SUB

choice:
  IF MENU(1)=1 THEN
    endflag=-1
  ELSE
    MENU RESET
    WINDOW CLOSE 1
    WINDOW CLOSE 2
    SCREEN CLOSE 1
    END
  END IF
RETURN
```

Listing II

Game Killer

The End

Max Tennant is off on a trip across Africa in a Land Rover. This makes it a little difficult for him to use his Amiga. Before he hits yonder dunes he'll hit you dudes with his last column

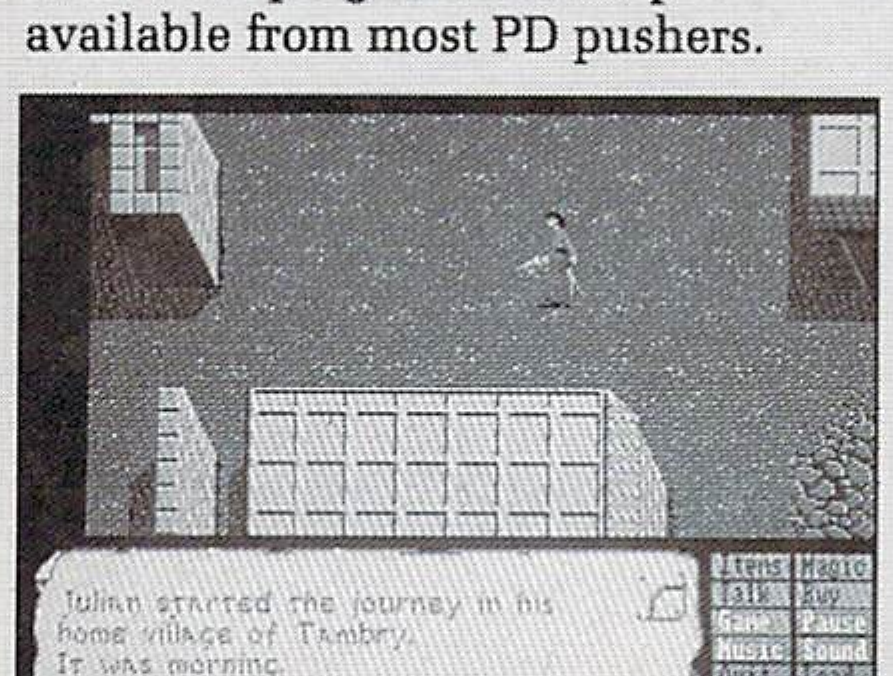
Faery Tale Adventure

MAX TENNANT says: It is a well kept secret that there is a cheat mode for Faery Tale that no one has discovered yet. Here's the deal:

To turn on the cheat mode, take a saved game file and use the public domain program NewZap – or similar file editor – to patch byte 18 of the save game file to a non-zero value. Then save it. When this saved game is loaded it will enable the secret cheat mode, in which you have the following key commands:

Arrow keys – move rapidly over any terrain.
B – summon the the golden swan.
R – rescue the princess.
= – display your current location in coordinates.
F10 – display your location in a different coordinate system.
F9 – advance time by one hour.

Note that you should be *very careful* using NewZap. You shouldn't try using it on your Faery Tale master disc, only on discs you have created by saving games from inside the program. NewZap is available from most PD pushers.



Helter Skelter

IAN J PARLEOUS says: I've been hooked on Helter Skelter ever since it first came out. It's a skill game. Now it's been re-released I'll bet there are a lot of lamers who can't get their acts together. I certainly hope so, it's mega-addictive. Just for them here are some codes.

Level 11 – Spin
Level 21 – Flip
Level 31 – Ball

Wizball

CHRIS GLOVER says: I've found out an amazing li'l cheat for Ocean's Wizball. Press pause and type in RAINBOWT.

Well thanks, Chris, I'll try that. By the way, your parents have dreadful taste in notepaper.

Sword of Sodan

CHRIS ASPINALL says: There used to be a very nice girl called Nancy who worked in the marketing department at Discovery Software. She isn't there any more 'cos she came to live in England. But her name lives on in the program. Type NANCY into the high score table for infinite lives, then press Return to skip levels.

Fighter Bomber

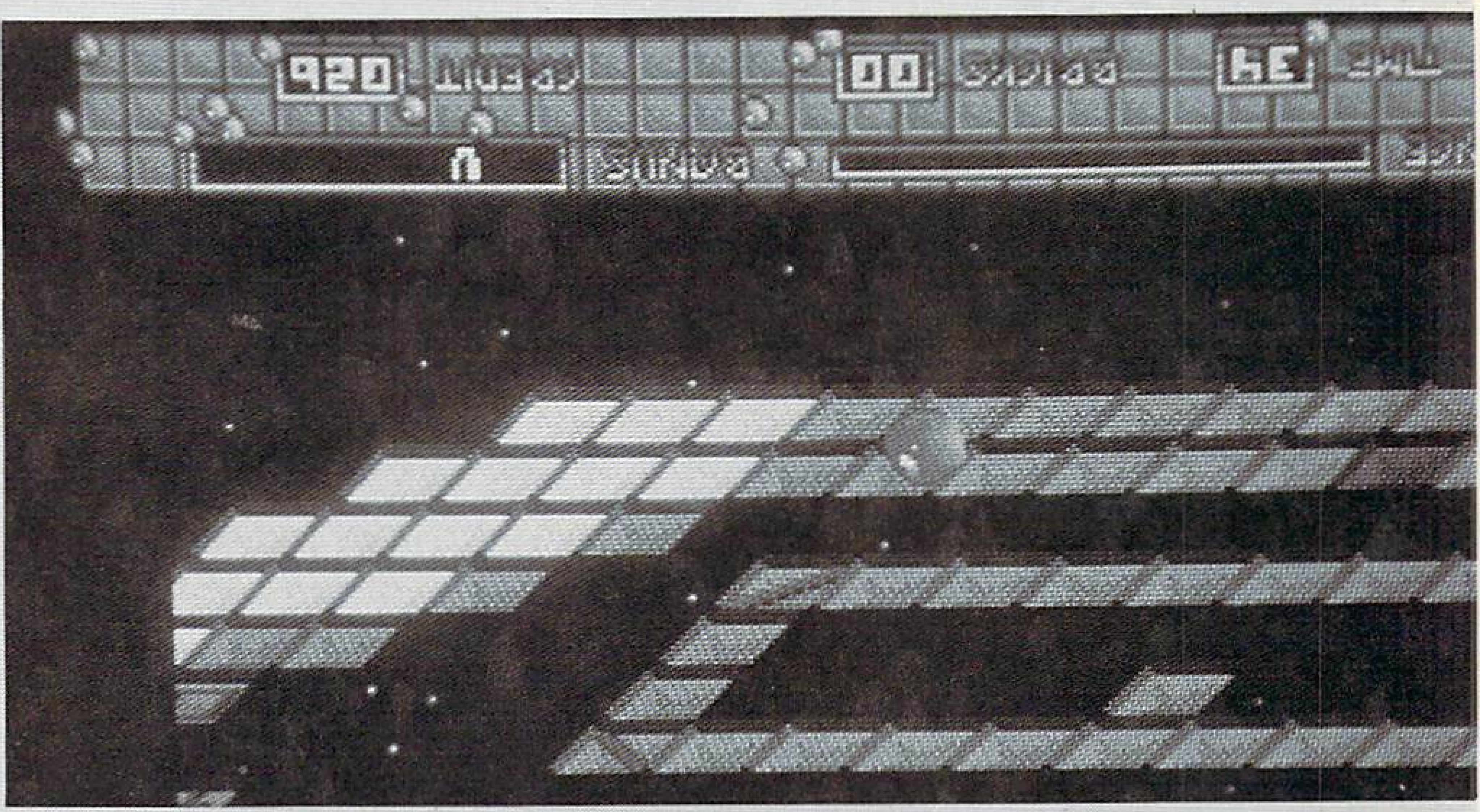
IAN HARRIS says: When you are prompted to select a pilot at the beginning of the game, change one of the pilot's names either to SO WHAT IF I DO, BUCKAROO or BOOMERANG. The first two of these bring up a message at the bottom of the screen. This will allow any pilots played to access all of the missions.

Typing in HOORAY FOR MICK as one of the pilots names brings up a message but doesn't seem to do anything else.

Magic Marble

STUART BUSHBY says: Losing patience trying to get through the *10* tedious levels in Magic Marble? Welllll... here are the passwords for each level, including the final one for an amazing little graphics show:

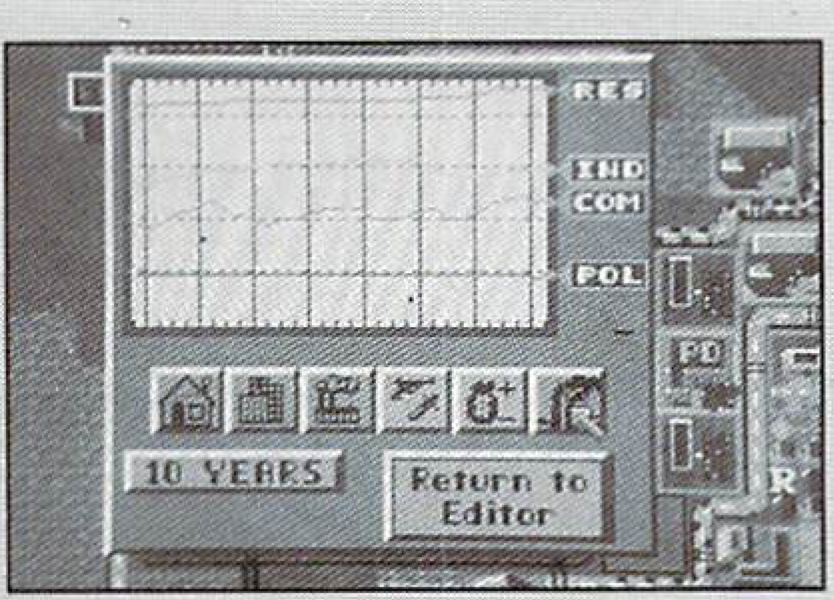
Level 1 – Advertiser
Level 2 – Everywhere
Level 3 – Toothpaste
Level 4 – Connection
Level 5 – Cleverness
Level 6 – Copywriter
Level 7 – Television
Level 8 – Cigarettes
Level 9 – Complicate
Level 10 – Impossible
The End – Interested



Test Drive 2

SUSAN VOLER says: Here's a teaser for you – I'm not going to tell you what it does. Load up Test Drive 2. At the start of any stage type GASS, and see what happens!

Sim City



DAVID KEEN says: Choose a landscape and put in it one coal plant, three residential zones, three industrial zones and two commercial zones. Then select Fastest from the Speed menu.

Put the tax up two per cent every year until it reaches 10 per cent, then select Auto-budget and leave your computer for long enough to watch Miami Vice.

After the programme put tax up by one per cent, leave the computer on overnight (turn the monitor off). By the morning you should have $65,000. Don't build any railway, police or fire stations.

DEREK RAWSON says: Build lots of residential areas close to each other, after that build *tiny* bits of park near them. When it comes to December turn Auto-budget off and change the tax rate to 20 per cent. The people will not leave. When you have done that change the game speed to fast, and when the tax screen comes up in January you will have collected lots of cash.

Make sure you put the rate down below 7 per cent before you select the option to go with these figures. Never give anything less that 100 per cent to fire, police and transport departments. If you build a nuclear plant, make sure there is some water near to it.

Prison

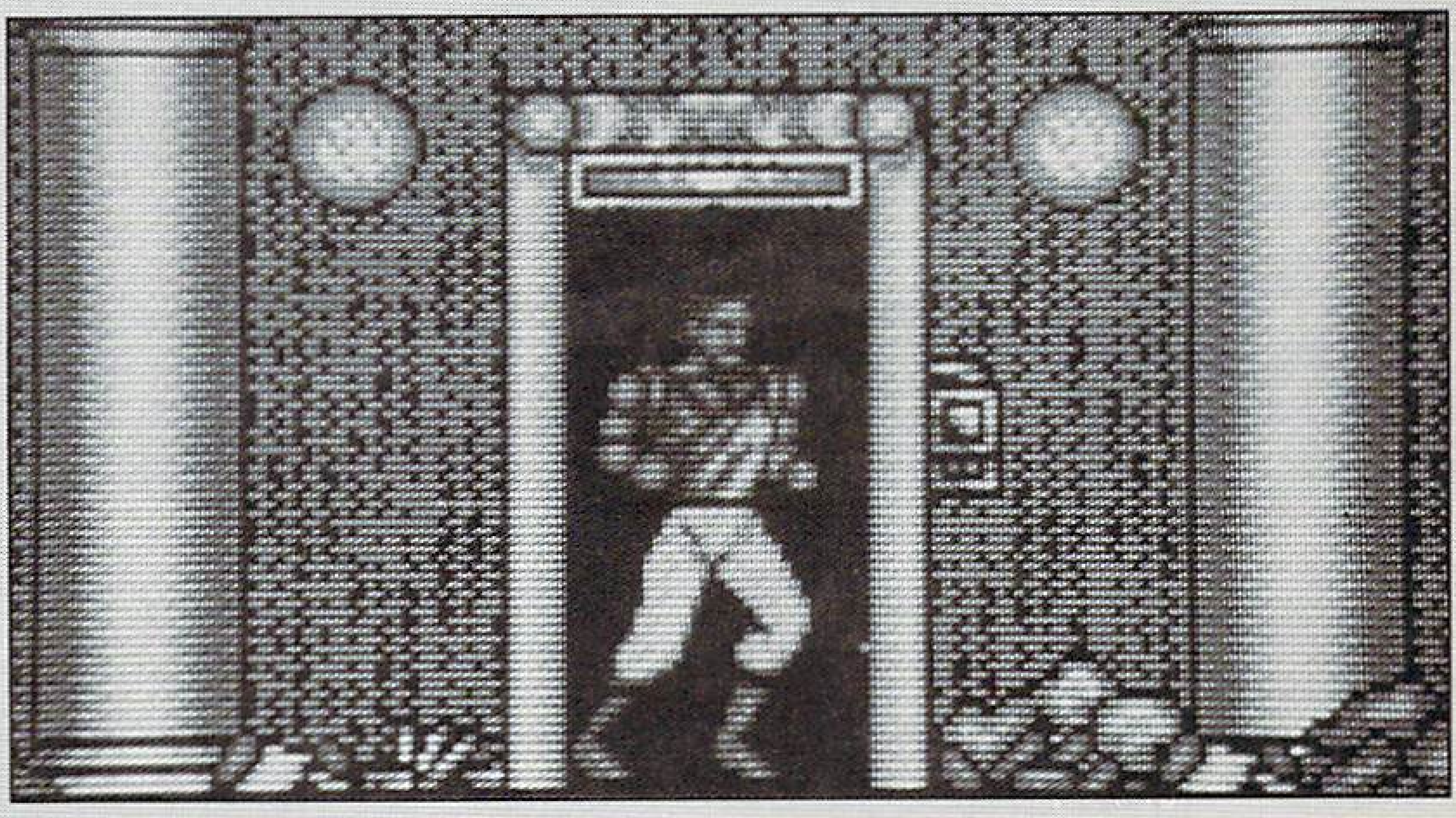
BEN COWDALL says: To pick up an object you must stand in front of it. Search the packing case after killing a droid. A small orange blob will flash on the panel when you enter a room with an object hidden in it.

To defuse the booby trap, pull the red wire and take explosives. Jump two land mines and one hole to find stooge. Trade the jewel from under the bed for a vending token.

To get into the night club wear a tie. Here you get the plank, which can be used to make the big hole smaller. Then jump over the now small hole.

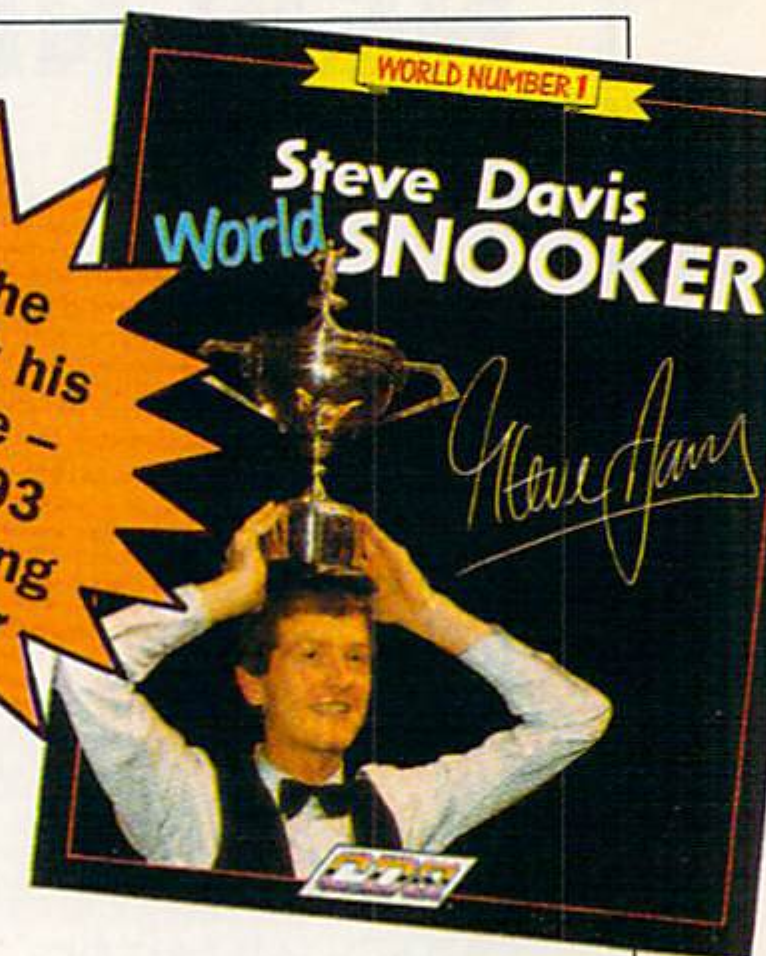
Use the token in the vending machine, choose inter-city as the destination and take the ticket. Give the ticket to the guard. Find plug two. Take it up in the first lift to open the door, get plug three to open the first level locked door.

There is loads to this game, it's great. The more you play it the more you find. There are some neat things like getting the combination off the guy in the park to open the vault and get credits. Try this: Go south-west from the bank. Search near the dustbins. Take object, go past the teleport and to the secretary to insert the object. Have fun.



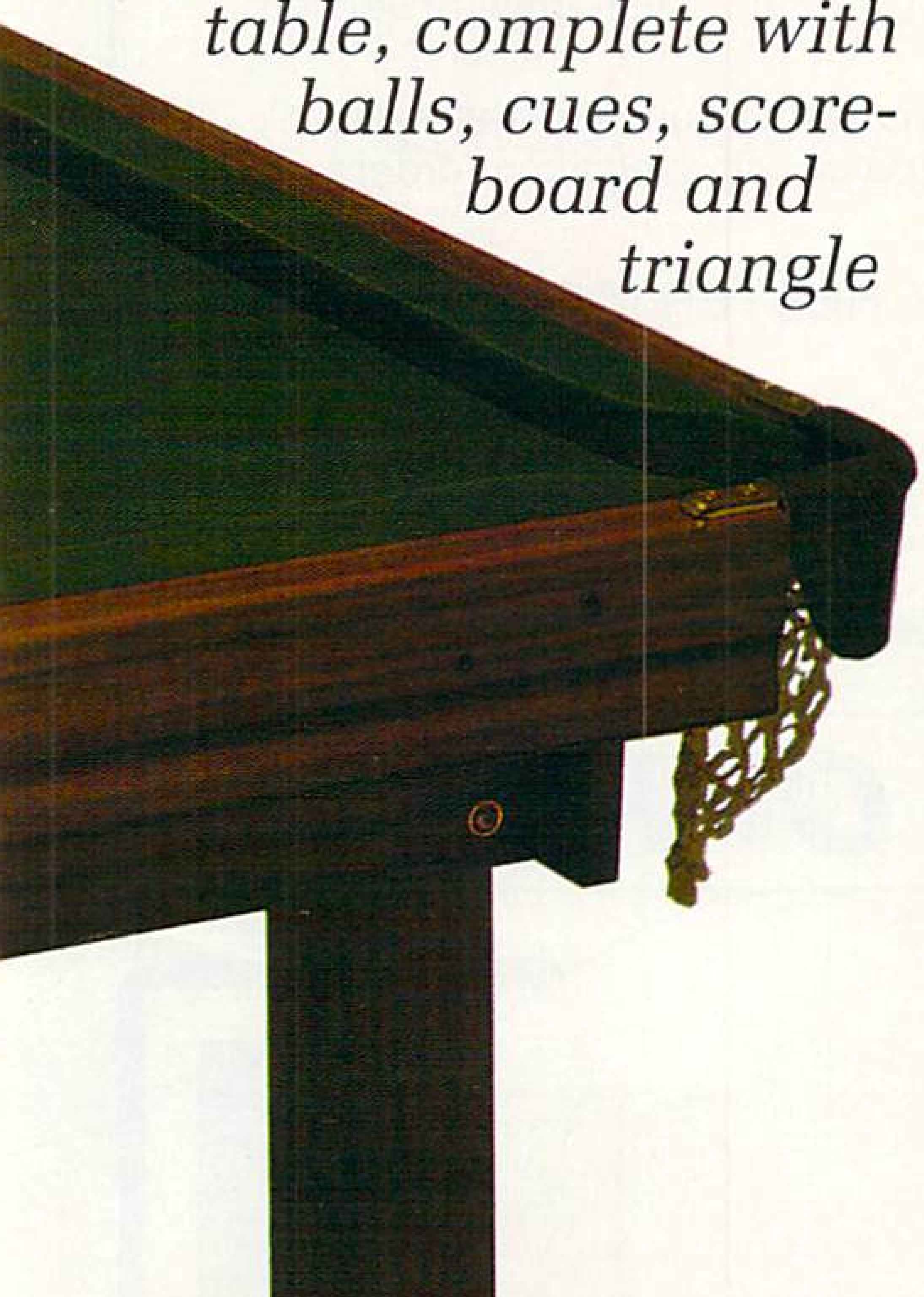

Get on cue with
WORTH £300
Five runners-up will each receive a signed Steve Davis snooker cue worth £20

Steve Davis



Beat the master at his own game – see page 93 for an amazing special offer

Missing out on a wasted childhood? Think you might prefer the real thing to a computer simulation? Then dust off the old grey cells, enter this brilliant competition and win yourself a top quality 6ft Pot Black snooker table, complete with balls, cues, scoreboard and triangle

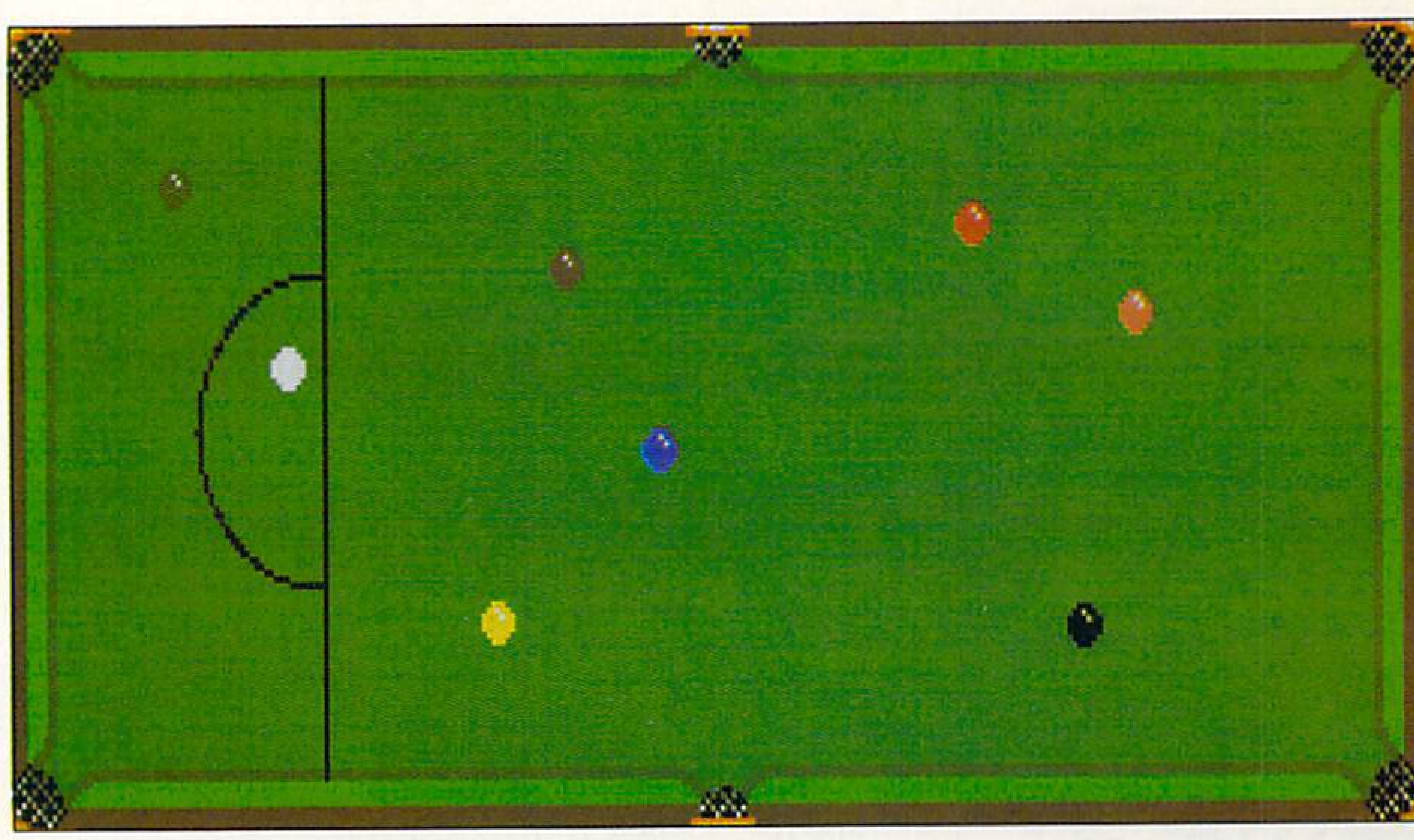


How to enter

STUDY the snooker table below, taken from an imaginary match being played on an Amiga between Steve Davis and a lesser opponent whose name we can't remember. Using your ice cool, analytical brain, calculate the theoretical maximum score that Steve can score from this position.

Once you have the score worked out, write it on the entry form along with your name, address and phone number. Then post it to us at the address shown and wait for the closing date. It couldn't be simpler. Well, it could be if we told you the answer. But we won't.

Good luck, and may the best person win.



Rules of play

- The first correct entry drawn from the magic bin liner on May 31 will win the snooker table.
- The subsequent five correct entries drawn will receive runners-up prizes of cues signed by Steve Davis.
- Feel free to photocopy the entry form if you don't want to vandalise your magazine. But be warned – if we find anyone sending in multiple entries we'll send Barry Hearns and the boys round.
- Employees of Interactive Publishing and people who don't have space for the table in their living rooms are disqualified from entering.
- The editor's decision, however warped, is final.

ENTRY FORM

I calculate the theoretical maximum score to be: ....

Name ....

Address ....

....

....

Postcode ....

Phone ....

I have read and understood the rules of play and agree to abide by them.

Signed ....

Date ....

Send your completed form to: *Steve Davis World Snooker Competition, Amiga Computing, Europa House, Adlington, Macclesfield, SK10 4NP.*
Closing date May 31, 1990.

NEW NEW X-COPY II NEW NEW
Version 2.1

X-COPY II is the ultimate disc duplication system for your Amiga. This superb program is not just a back up system, it also incorporates a full disc editing program.

Just look at its features:-

★ Adapts itself to any configuration
★ Mouse controlled
★ The most comprehensive back up tool available
★ Also backs up Atari ST, Archimedes, IBM and other discs
★ Checks discs for errors
★ Formats discs in 36 seconds
★ Optimises data, re-organises files for faster loading
★ Works with 1 or more disc drives
★ Full upgrade service

X-COPY II IS THE BEST, GUARANTEED

OUR GUARANTEE:– At the time of purchase if you can find a program that is more powerful than X-COPY II, we will refund your money.

X-COPY II now available only £19.99 (plus £1.00 for postage)

X-COPY II HARDWARE VERSION available now only £29.99 (plus £1.00 for postage). The hardware version requires two disc drives.

Orders can be sent to our address below. Please enclose a cheque for the required amount and state your name, address and your order. Or telephone 061 228 1831 for immediate despatch with credit card orders.

Access

SIREN SOFTWARE, 84-86 PRINCESS STREET, MANCHESTER M1 6NG
TEL 061 228 1831

VISA

AMIGA COMPUTING READER OFFERS

Save on batteries!
For your personal stereo, radio or TV

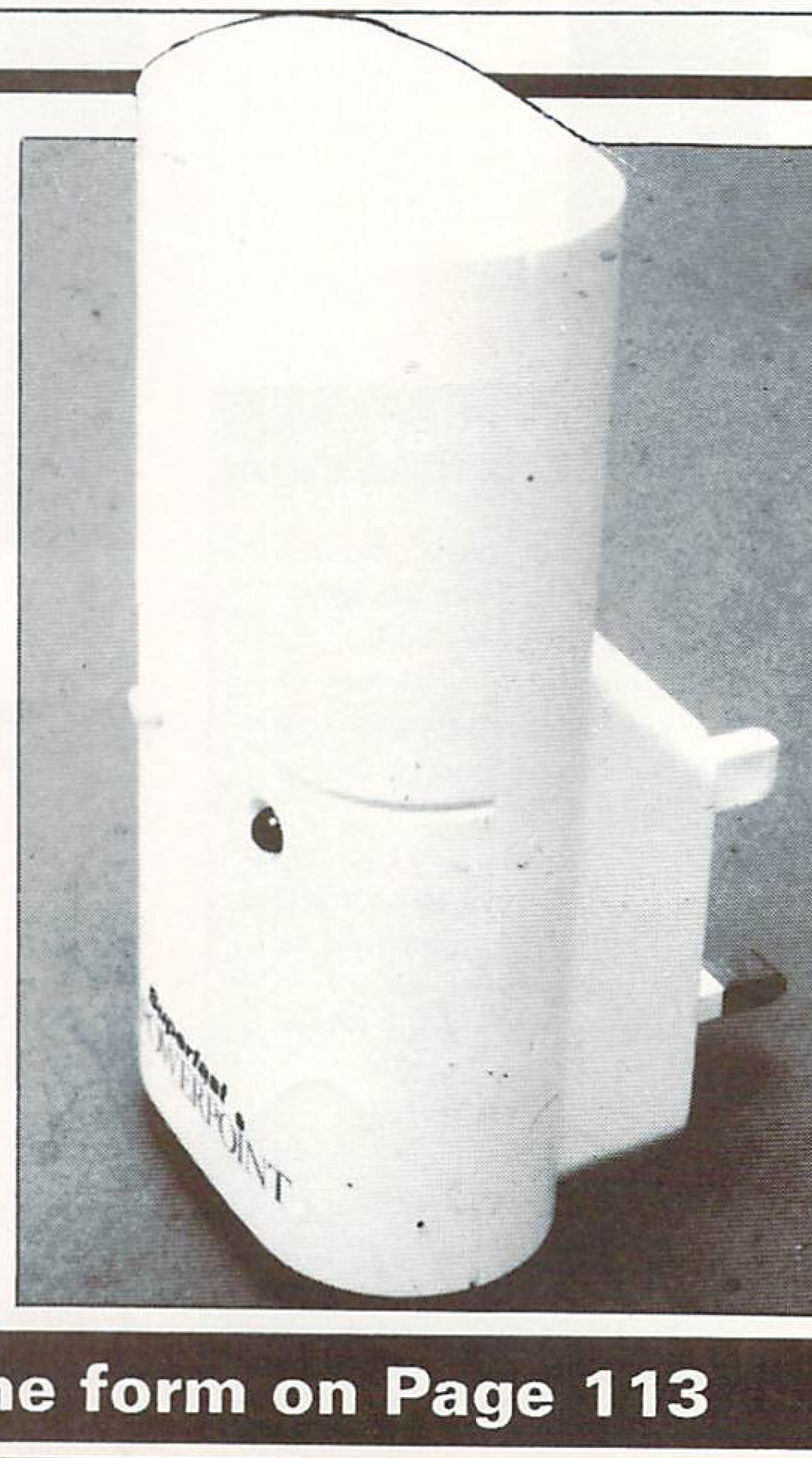
You know how expensive it is to replace your batteries when they run down. Even with rechargeable batteries you still have to wait 14 hours for a full charge.

We have solved the problem with the unique superfast powerful battery and charger kit.

This amazing device will completely charge four standard AA size rechargeable batteries in under 2 hours and each battery can be recharged at least 1,000 times.

Further, for a limited period we can sell the charger and four rechargeable batteries at the staggeringly low cost of £19.95 (plus £1 p&p).

It will pay for itself within weeks



Place your order today, using the form on Page 113

APL.68000: Weird or wonderful?

The only thing which is simple about APL is its name. Here Nic Veitch looks at A Programming Language

SHOW someone a function listing from APL and they will say something along the lines of "What sort of programming language is that?" and the answer is of course that it isn't any sort of programming language. It is a mathematical language.

Back in the Sixties there was a guy called Iverson who decided what the world really needed was a new form of mathematical notation, a way of writing complex and often repetitive formulae in a way that was easy to understand.

He felt so strongly about this that he gave lectures, wrote papers and then, in 1962, produced a book outlining the symbols for the language and the format it would take.

The book was called *A Programming Language* and that's exactly what Iverson's strange squiggles became, a symbol-based programming language which, with the typical lack of imagination in those days, was called APL.

Now APL comes to the Amy in the shape of APL.68000 from Micro APL Ltd., and very well presented it is too. Open the excellent hard-box to reveal two manuals, a set of stickers and a single disc. And it's only half full at that. Well, size isn't everything.

The first manual is around 280 pages of just what it is that APL can do. A lot of this is taken up by definitions of all the strange symbols and a discussion on what exactly is meant by the terms monadic, dyadic and nomadic. It is fairly well written and gives enough information for the APL illiterate to get an idea of what's going on. There are examples, but in some cases I think these are too simple.

THE second manual is really more of a manualette. an Amiga-specific guide to how APL uses Intuition and a breakdown of the sample files included. It also tells you where to put all the little stickers. This is a task which can be tackled in one of two ways – the cunning way or the *Amiga Computing* reviewer way.

I managed a fairly straightish set by lowering them on to the front of the keys and pressing them flat with a small screwdriver. The more sane of you would possibly prefer removing all the keys and sticking them that way.

This method has the added bonus that you can easily reconfigure your keyboard as AZERTY if you want to run some German software.

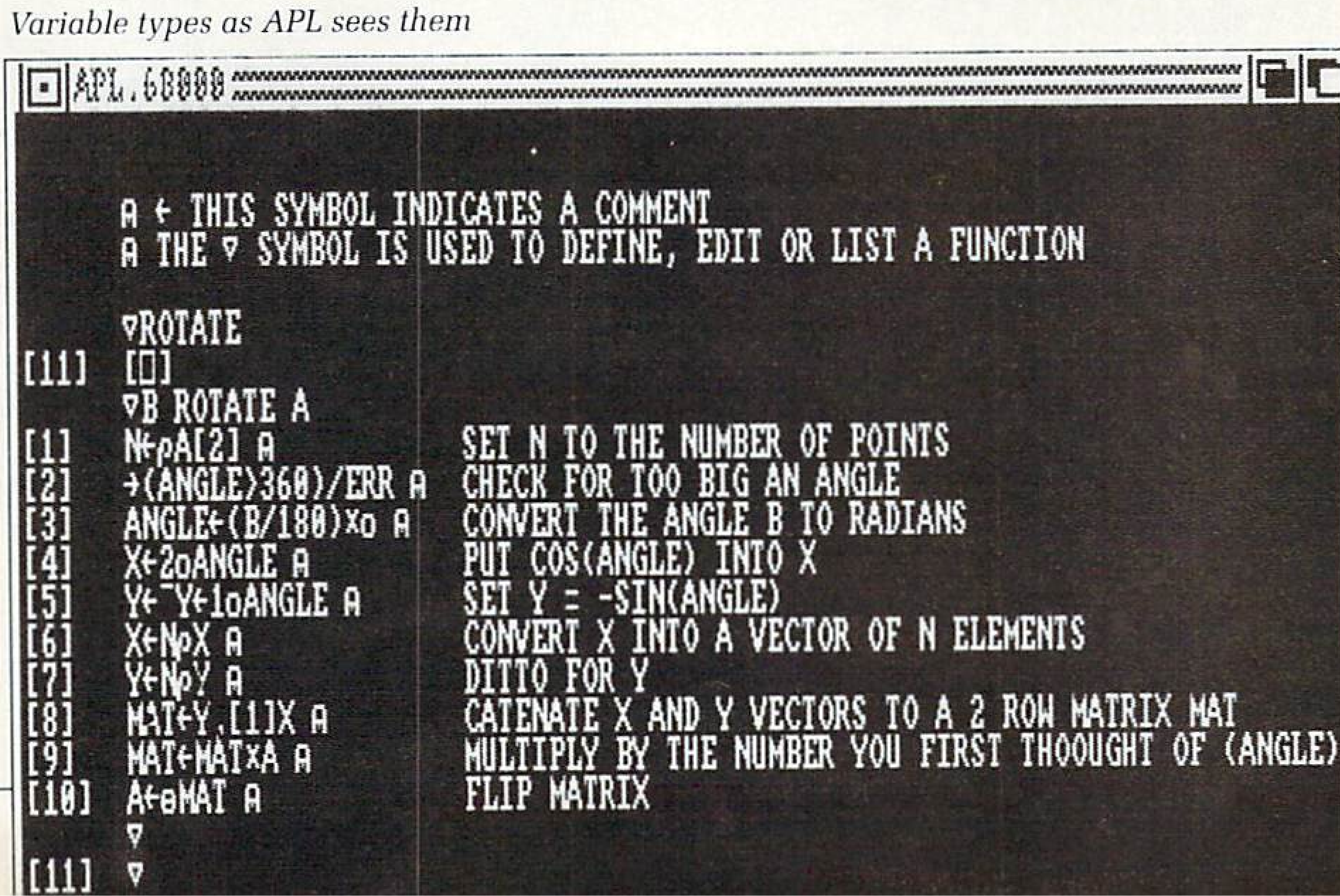
The stickers are very important. They don't just tell you where the symbols are, but where everything is. When you run APL all the familiar brackets, quotes and colons will magically swap about. There is a word to explain this sort of behaviour. No, not that one. The word I was thinking of is compatibility.

Years ago, when I had a C64, I used to take the keys off and swap them around to confuse people who didn't know how to type. Their experience would be similar to an APL programmer's if he was suddenly introduced to an environment where all of his symbols were in different places. It would be like learning to type again.

In the interests of system portability the keyboard layout for APL remains the same, whether you are using an IBM4040, a Vax, an A500 or an ST .

Writing a program is a very different ➤

Variable types as APL sees them



experience in APL. For a start there are no FOR–NEXT loops. APL tends to operate on a more interactive level. There are no listings. It's more like consulting the oracle than writing a program.

The nearest analogy I can think of is Prolog, which is used just as often in an interactive mode than in any set form.

That APL doesn't have loops is not a disadvantage. The whole ethos is away from that sort of structure. And why not? Think of a problem. Say you have a table of numbers and you want to find the maximum. How would you do it in Basic? A nested FOR–NEXT with a dummy variable holding the best so far? In APL this can be done with four symbols:

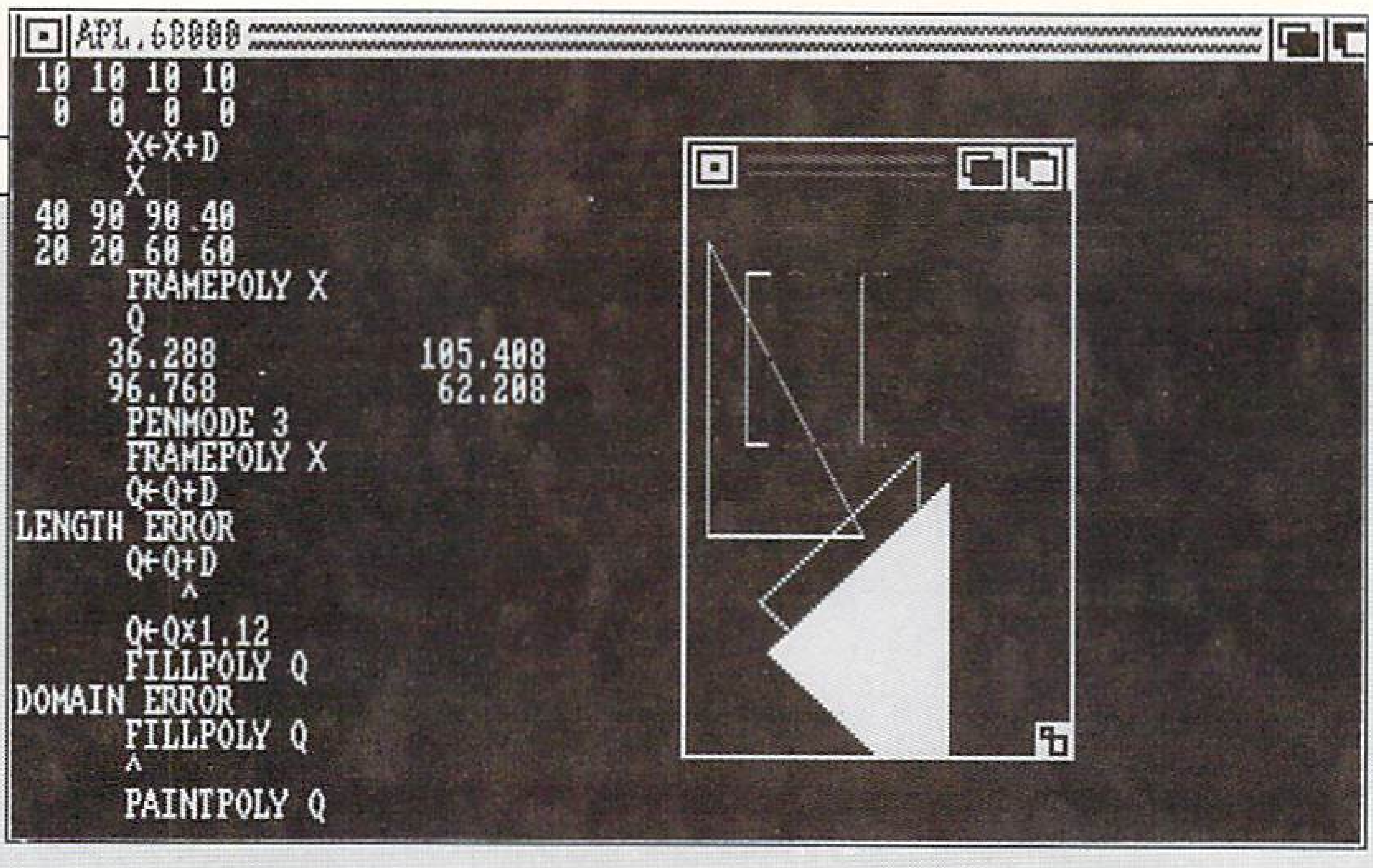
```
      X← 3 3 ρ 9?10
      ⌈/ ⌈/ X
10
```

where X is a variable containing the table of data. The first line sets up x as a three by three matrix full of random numbers. The little arrow pointing to the left assigns the function to the right to the variable. Like the LET command in Basic but for grown-ups. The second reduces to the maximum by row and by column.

APL resists the whole idea of top down programming. Instead of breaking a problem up into successively smaller problems and then coding it, the way of APL is to tackle the problem head on, as a complete task. A sort of holistic approach, you might say. If you can express the problem then you have the answer.

A variable in APL covers a whole range of data types. A scalar is just a single number, a vector is a string of numbers – like a one dimensional array in Basic – and a matrix is a table of numbers, a two or more dimensional vector. In fact APL will handle up to eight dimensions for a variable, though they get a little tricky to display on the screen (see Illustration 1).

A common criticism of APL is that it is slow. When you consider the speed as the time it takes to execute a statement this is true, but when you take into account the fact that one statement in APL can replace several lines of code in most other languages the comparison seems unjust. For example, consider the Deal function or ?. The following APL statement assigns to the variable X the numbers ➤



INTUITION eh? Can't live with it, can't live without it. Well that seems to be the approach of APL.68000

When run from Workbench, APL assumes a nice healthy amount of memory is available for its workspace. Then it runs into a few problems. It tries to grab too much and things go all slow and horrible. Closing a few windows will sort it out, but it's still a bit of a horror drama situation if you have something important in ram.

The problem can be avoided if you run APL from the CLI instead. Then you can decide exactly how much memory to set aside for it. This memory is reserved for its workspace, where it keeps all the variables and functions. If you want to open a few windows from APL, or worse still set up a few screens, you will have to leave the system with enough memory to cope.

Windows are standard AmigaDos and can support as many or as few of the usual gadgets as you require, although getting a border round the edge is a bit of a problem. Screens can be low or hi-res interlaced or no.

The functions supplied with APL.68000 include some to help set up screens and windows. At least, that's what they're supposed to do. They are also fairly reliable invitations for the guru to pay a visit.

When they work, however, they work very well. Functions are supplied to draw wireframe or filled shapes, at least as fast and as easily as in Basic.

If more effort had gone into this side of the software APL would have been more useful and valuable. It is a fair argument to say that it was designed to run on mainframes with lineprinters, but unless the existing technology is utilised it will have no place in the systems of tomorrow.

A function defined – this is the closest you'll get to a listing

```
APL.68000
COPYRIGHT (C) 1986 MICROAPL LTD
WS SIZE = 100K, VERSION =6.04C
CLEAR WS

      SCALAR ← 10
      SCALAR
10

      VECTOR ← 20 ? 20
      VECTOR
3 16 11 13 8 6 2 7 20 14 5 19 4 10 18 12 17 1 15 9

      MATRIX ← 10 10 ρ ι100
      MATRIX
  1   2   3   4   5   6   7   8   9  10
 11  12  13  14  15  16  17  18  19  20
 21  22  23  24  25  26  27  28  29  30
 31  32  33  34  35  36  37  38  39  40
 41  42  43  44  45  46  47  48  49  50
 51  52  53  54  55  56  57  58  59  60
 61  62  63  64  65  66  67  68  69  70
 71  72  73  74  75  76  77  78  79  80
 81  82  83  84  85  86  87  88  89  90
 91  92  93  94  95  96  97  98  99 100
```

➤

one to 10 and shuffles them randomly:

```
   X← 10 ? 10
   X
6 9 1 7 4 5 10 8 3 2
```

Just one statement. How long would that take you in Basic? Or C?

This isn't an isolated case. There are many more examples of very useful symbols, like iota, the index symbol. In one form, the dyadic or two-argument form, it will return the index or the position the variable to the right occupies in the variable to the left:

```
      5 4 3 2 1 ι 4
2
```

Here the number 4 appears in position two of the vector to the left. In its other form, monadic or taking only one argument, it will produce a vector of numbers from one to the value of the argument. This can be combined with more conventional mathematical operators to provide a vector containing any arithmetic sequence. This works out as four plus twice all the numbers"B]9!:991M9iZEu5

Obviously as a language it is more

```
   4+2×ι7
6 8 10 12 14 16 18
```

biased towards mathematical and statistical problems, but that isn't all it can do. Its design gives it away as a language for theorists, mathematicians and scientists, not programmers.

Variables can just as easily be strings as numbers though, so it isn't a language only for those who speak in floating point.

One furniture design company uses APL to store the dimensions of all its units. A simple program can work out which cupboards will fit in your kitchen.

Admittedly, as an implementation on a micro it is probably aimed more at the hobbyist, but with multi-tasking support and the terminal emulator it is certainly possible to network it on the Amiga.

A must for serious nutters, and a truly alternative language for those interested in learning. Forget Swahili and Apache, see if you can get a linguaphone record for APL.

REPORT CARD

APL.68000
Micro APL Ltd 01-922 8866
£99.95

IMPLEMENTATION
A full version. Supports all standard features. Unfortunately bad habits when faced with AmigaDos puts its usefulness in jeopardy.

SPEED
Hard to judge. Statement execution is slow, but an APL statement does 10 times as much as a line in any other language. Irrelevant in interactive mode.

VALUE
A far more powerful Amiga interface would be necessary to make it worthwhile for the professional, but all the features of standard APL are there.

OVERALL 67%

A good implementation of a lovely language, but intuition handling lets it down. Perhaps later versions will remedy this.

Fasten your



The pros and cons of partitioning

THE ample instructions for the Xetec make a major point of partitioning your drive before you start any serious work on it. If you partition a drive you split it up into several parts (not physically of course) so that to the system it appears as though you have several separate drives.

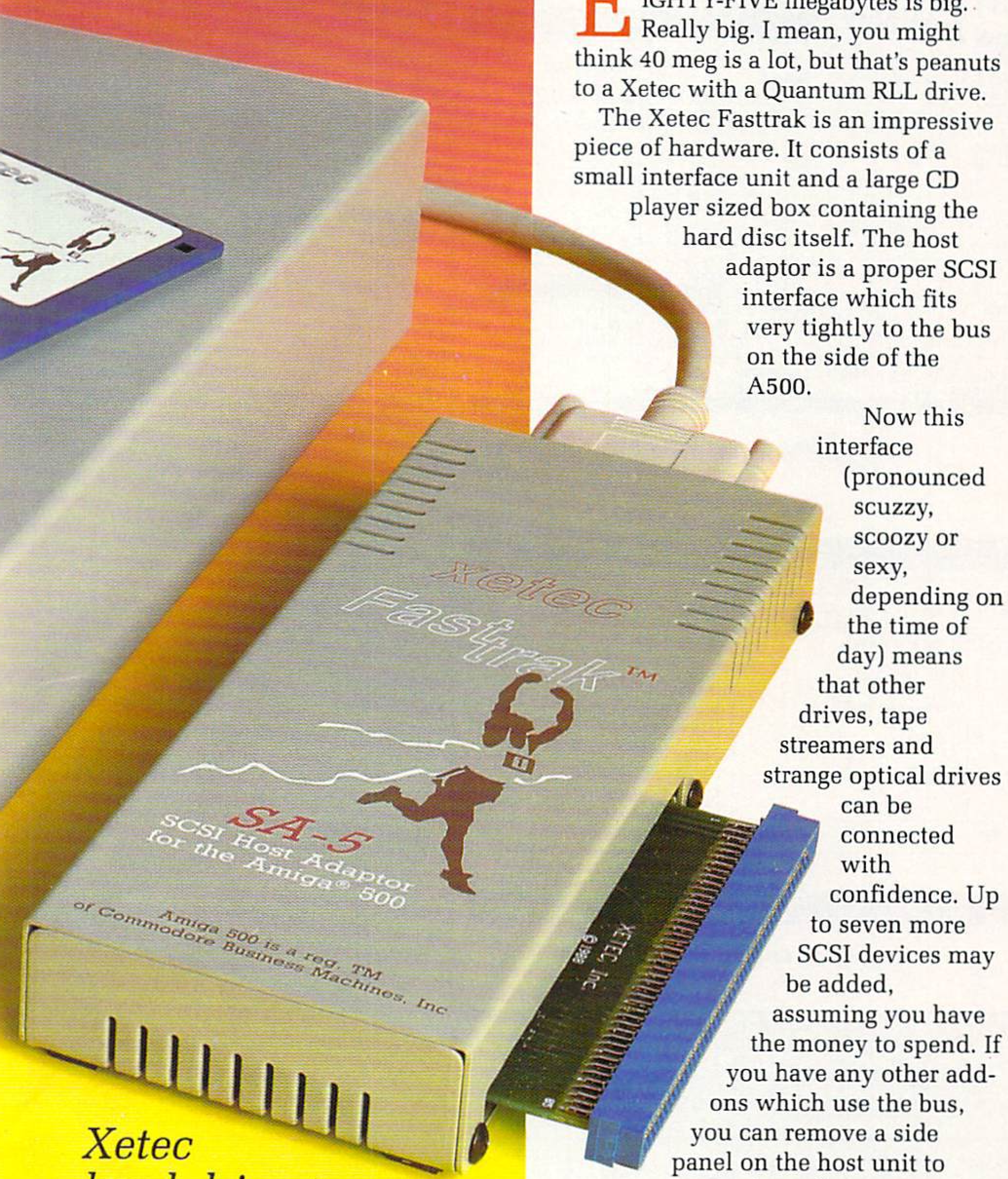
Apart from the simple blessing of immediately providing some sort of organisation, there are several other good reasons for doing this.

The greater the number of partitions, the greater the speed of the drive because it doesn't have to sort through as many files in one go. Each partition can be re-formatted separately, providing an instant backup facility.

If the drive should get its knickers in a twist by some quirk of fate or AmigaDos, the damage, with a bit of luck, will be contained to one partition, allowing you to regain information from your backup partition.

There is always a drawback though. And it's a pig. Each partition will grab a bit of ram for itself, usually about 30k. With three partitions, this leaves only 734520 free bytes on a 1 meg, KS1.3 A500.

safety belt!



Xetec hard drives are renowned as the fastest available. John Kennedy plugs an 85 meg version into his A500 and discovers access times that'll make your toes curl

EIGHTY-FIVE megabytes is big. Really big. I mean, you might think 40 meg is a lot, but that's peanuts to a Xetec with a Quantum RLL drive.

The Xetec Fasttrak is an impressive piece of hardware. It consists of a small interface unit and a large CD player sized box containing the hard disc itself. The host adaptor is a proper SCSI interface which fits very tightly to the bus on the side of the A500.

Now this interface (pronounced scuzzy, scoozy or sexy, depending on the time of day) means that other drives, tape streamers and strange optical drives can be connected with confidence. Up to seven more SCSI devices may be added, assuming you have the money to spend. If you have any other add-ons which use the bus, you can remove a side panel on the host unit to reveal a through connector.

On a Kickstart 1.3 A500, installation is a matter of changing the mains lead from a euro-plug to a British 13 amp, plugging the host adaptor into place and connecting the cable between drive and host.

This cable is an incredibly useful two metres long, so finding somewhere to place the drive won't be a problem.

If you don't want to put your monitor on top of it, you could relegate it to the floor, well out of accidental kicking reach. It would fit even better on a shelf of a split level desk. The drive will auto-boot with 1.3 Kickstart roms, which is what most A500s have in them these days. If you still have version 1.2 roms, then you will need to perform an initial boot from floppy.

Kickstart 1.2 owners also need to take apart the host adaptor and change a jumper. Initial settings for the jumpers are different from those in the manual, but clearly mentioned in a file on the floppy.

FOR those who charge ahead and connect everything without reading instructions, there are no problems. I got in a muddle by mis-understanding the diagrams, but a phone call to Third Coast soon put me on the right sector, er, track.

The drive comes ready-formatted, complete with Workbench 1.3 and some utility software to allow immediate booting. The time between powering-up and being presented with a usable Workbench is a shade under 30 seconds, but this is always going to depend on the complexity of your startup-sequence.

With the addition of an extra circuit board, the host interface is capable of supporting up to 8 meg of expansion ram.

If you do have lots of ram, you can take power from the drive instead of putting strain on the A500's supply. For your reference, the Commodore A590 will only allow a maximum of 2 meg of extra memory to be fitted.

This device would be perfect if you were running a bulletin board. An enormous amount of on-line storage, darn fast, and always the ability to expand further if the need arises via the SCSI port.

For the Amiga to be used in a professional application, whether for video or sound or whatever, again this drive would be very useful. Here, the ability to add a compatible tape

➤

➤

streamer is a must, and one is easily available from Third Coast.

The Xetec's ruggedness impressed me, brought home by a little domestic disaster. I was developing a program at work and took it home to use on my Vortex. Arggh!

My program needed six files open simultaneously, and the Vortex turned its toes up and died, needing a re-formatting to get it going again, (thank goodness for hard disc back-up utilities).

Meanwhile, the Xetec carried on as if nothing unusual was happening. For use at home, I changed the program to open the files in my ram disc instead.

The Xetec under review is really fast, with a quoted access time of 11 milliseconds (msec) and a 64k cache. Compare this to a time of 30 msec on a Vortex, or even more on a A590.

Whether or not you would ever notice this speed at first glance is a matter of conjecture, but I did notice all the icons popping up with more than their usual vigour.

If you are performing a complicated function on data stored on a large database, or copying across a large sub-directory, the speed is very noticeable indeed.

But it's not cheap. Don't listen to anyone who tells you a fraction under a grand is not a lot of money. My student upbringing has made the value of money important to me (all right then, I'm tight) and for this sort of money I could have survived in digs for two terms at least, not including Guinness.

How does it compare to prices for PC hard drives? Well, it seems to conform to the rough formula of multiplying the PC price by two and, as such, is in line with all the other Amiga hard drives on offer.

So at the end of the day, taking all things into consideration, when the party has gone for a burton, would I want one?

You bet I would. It's lovely. But Third Coast won't take Green in part exchange, so it must be sent back.

For the applications for which it is designed this hard drive will excel. I'll miss it. It was nice. Very nice.

REPORT CARD

Xetec 85 meg hard drive (11 msec)
Third Coast 0257 472444
£999
Also available:
45 meg (25 msec) £649
65 meg (25 msec) £699
85 meg (25 msec) £799
109 meg (25 msec) £999
251 meg (25 msec) £1995

EASE OF USE...
Plug in and go.

SOFTWARE ......
The utilities supplied include programs to partition and back up the drive to floppies. They work.

SPEED ....
Boots up in average time, but flies through all other operations.

VALUE ....
Compared with other drives, taking bytes-per-penny into consideration, it's a lorra loot, but it's worth it.

OVERALL 90%

Xetex hard drives are the fastest.

SEE ORDER FORM ON PAGE 113

Castle Software

COME TO THE PROFESSIONALS!!!!

ACCESS / VISA NOW TAKEN

2 William Clowes Street
Burslem
Stoke on Trent
ST6 3AP
Tel: 0782 575043

AMIGA EDUCATIONAL

Postman Pat	7.99
Fun School 2 6-8	13.50
Fund School 2 Under 6	13.50
Fun School 2 Over 8	13.50

AMIGA ADVENTURES

Bards Tale	7.99
Bards Tale 2	16.99
Bureaucracy	6.99
Corruption	7.99
Faery Tale Adventure	11.99
Fish	7.99
Gold Rush	9.99
Hollywood Hijinx	7.99
Indy Jones the Adventure	16.99
Legend	6.99
Lords of the Rising Sun	12.99
Leisure Suit Larry 2	21.95
Maniac Mansion	17.95
Manhunter	9.99
Murder in Venice	7.99
President is Missing	9.99
Plundered Hearts	6.99
Police Quest 1	10.99
Quest for Time Bird	7.99
Romantic Encounters	6.99
Space Quest 1	9.99
Space Quest 2	9.99
Space Quest 3	19.99
Thexder	2.99
Tanglewood	4.99
Ultima 4	19.99
Warlocks Quest	4.99
Hound of Shadow	17.99

AMIGA STRATEGY/SIM

Austerlitz	16.99
Armegeddon Man	2.99
Borrodeno	17.99
Bomber	19.99
Conflict Europe	11.99
Dragons of Flame	17.99
Armarda	17.99
Destroyer	8.95
Fire Zone	7.95
F-29 Retaliator	19.95
Flight Path 737	4.99
Waterloo	11.99
North and South	17.99
Power Struggle	4.99
Honda RVF	15.99
Stunt Car Racer	15.95
Sorcerer Lord	7.95
TV Sports Basketball	19.95
Volley Ball Sim	7.99
Gunship	15.99

AMIGA CLEARANCE

Advanced Ski Sim	4.99
Archepeligos	7.99
Artura	5.99
Alien Legion	7.99
Alien Syndrome	7.99
Backlash	5.99
Buggy Boy	7.99
Butcher Hill	5.99
Bomb Jack	7.99
Blasteroids	7.99
Craps Academy	4.99
Custodian	5.99
Captain Blood	4.99
Cogan's Run	4.99
Cybernoid	6.99
Deflector	5.99
Dominator	6.99
Ebon Star	2.99
Eagles Nest	4.99
Foundations Waste	4.99
Football Manager 2	6.99
Ferndez Must Die	5.99
Flintstones	5.99
Grid Start	3.99
Real Ghostbusters	7.99
Gold Runner 1	4.99
Gold Runner 2	5.99
Galaxy Forece	7.99
Hyperdome	4.99
Hollywood Poker	4.99
Hollywood Poker Pro	7.99
I.S.S.	6.99
Italia 1990	4.99
F18 Interceptor	8.99
Ikari Warriors	7.99
Irridon	2.99
Jug	5.99
Joe Blade	4.99
Joe Blade 2	4.99
Leathernecks	6.99
Led Storm	7.99
Little Computer People	4.99
Manix	3.99
New Zealand Story	8.99
Nebulas	5.99
Nord and Bert	5.99
Netherworld	5.99
Outrun	7.99
Prisoner of War	9.99
Pacland	6.99
Passing Shot	6.99
Preditor	6.99
Phobia	4.99
Phantom Fighter	5.99
Phantasim	3.99
Pioneer Plague	4.99
Phantasie	9.99

AMIGA CLEARANCE

Road Blasters	5.99
Rampage	7.99
Robbeary	5.99
Roger Rabbit	7.99
Road Wars	4.99
Sky Fox 2	7.99
Saint and Greavsie	5.99
SAS Combat	4.99
Side Winder 2	4.99
Sky Blaster	4.99
Solitaire Royale	6.99
Soldier of Light	7.99
Speed Ball	7.99
Star Goose	5.99
Slaygon	2.99
Terry's Big Adventure	7.99
Time Scanner	7.99
Tracers	2.99
Thunderbirds	7.99
Turbo Cup	5.99
Teenage Queen	7.99
Targhan	7.99
Terrorpods	7.99
Wicked	4.99
World Tour Golf	7.99
World Class Leaderboard	7.99
Zynaps	4.99
Treasure Island Dizzy	4.99

AMIGA TOP TITLES

Star Flight	16.95
Ninja Warriors	13.95
X Out	13.95
Sim City	19.95
Future Wars	17.95
Prince	17.95
Xenon 2	15.95
War in Middle Earth	17.95
Aquanought	15.95
Battle Squadron	15.95
Black Tiger	16.99
Chase H.Q.	16.95
Cabal	16.95
Drakkhen	19.95
Escape Single Castle	32.95
F16 Combat Pilot	15.95
Falcon	15.95
Full Metal Planet	16.99
Ghouls and Ghosts	15.95
Ghostbusters 2	13.95
Kick Off	12.95
Kick Off Extra Time	7.99
Lombard Rally	14.95
Lancaster	13.95
Laser Squad	14.95
Interphase	15.95

AMIGA TOP TITLES

Silk Worm	14.95
Populas	16.95
Switchblade	14.95
Axle's Magic Hammer	14.95
Space Ace	32.95
Stryx	15.95
Star Blaze	5.99
Turbo	12.95
Vulcan	12.95
Wild Streets	14.95

EXTRA'S

Drum Studio	4.99
1 Meg Expansion	59.95
Virus Killer	6.99
Music X	159.95
Ten x 3.5" DD/DD Disks	6.99
A501 Expansion	79.95
Dragons Lair (1Meg)	29.95

JOYSTICKS

Cheetah 125+	7.95
Quickjoy 2 Turbo	11.99
Quickjoy 5	17.95
Quickjoy Jnr	6.99
Navigator	9.99

Flying Shark	**6.99**
Bloodwych	**9.99**
Millenium 2.2	**9.99**
Blood Money	**9.99**
Menace	**6.99**
Baal	**6.99**
Chrono Quest	**11.99**
Shadow of the Beast	**18.99**
Rocket Ranger	**9.99**
Man Utd	**15.99**

CASTLE SOFTWARE
The company that offers reliability and service as well as excellent value for money!

Amiga Computing 2

Name ....

Address ....

....

....

.... Post code ....

Tel No. ....

Item(s) ordered	Cost
....	....
....	....
....	....
....	....
....	....
Total	....

AMOS

'AMOS could be the most successful games-related product ever!'
– Maff Evans, New Computer Express

Create Games
Create Demos
Create to Educate
Create ANYTHING!

'The power of AMOS is amazing, it's so easy to use and the commands are very straightforward. It's got total control over the Amiga'
– A. Kalim, London

'We use STOS to write educational software for the ST – it's very good but AMOS is 10 times better!'
– Jason Salisbury, Prisma Software

'Good luck in producing what looks to be the best utility released in a long while'
– V. Pike, Swindon

'A superb demo... After viewing the disc for nearly two hours solid I picked my chin up from the floor... AMOS is going to be an utter classic'
– D. Chapman, East Sussex

Whether you want to write action-packed games, stunning demos, stimulating educational software or even a database, AMOS is the perfect package for your Amiga.

AMOS has its own super-fast music module and comes with convert routines for Soundtracker, Sonix and GMC. There's even a command called VUMETER which allows you to link animation to sound. You can also substitute a new music routine at a later date if you want – AMOS is that flexible.

Commands like Rainbow and Copper Move allow you to create incredible graphical effects – and they are so easy to use.

You can display any of the hundreds of public domain fonts on screen, and AMOS sorts out the proportional spacing.

Jump to and from Workbench with a single keypress, allowing you to multi-task.

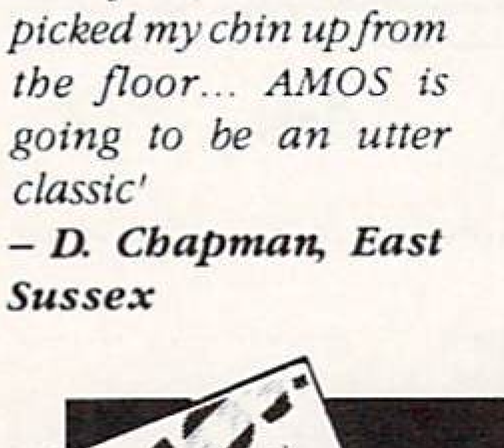
The menu commands have to be seen to be believed: Animated sprites in pull-down menus, the ability for the user to change the order of menu items while the program is running, multi-level menus and more.

AMOS is the package that the Amiga has been waiting for – the first software to unleash the true power of the Amiga to everyone.

But don't just believe what you see here – see for yourself. Send £2 for an exciting interactive demo in which you can try out many of AMOS's powerful commands for yourself! The text files on the disc are full of information too.

AMOS will go on sale in May – later than we planned, but it'll be well worth the wait!

MANDARIN SOFTWARE



Don't delay – send a £2 cheque or postal order and we will send you the AMOS demo disc by return of post.

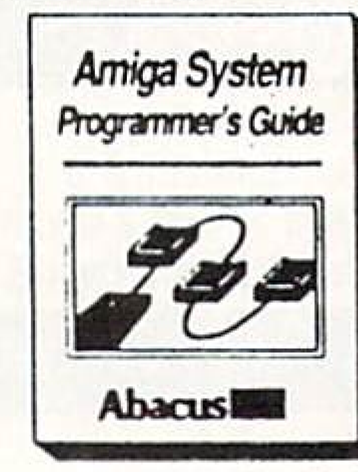
Send to: Mandarin Software, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP.

ABACUS BOOKS FOR THE AMIGA

Amiga System Programmer's Guide

A comprehensive guide to what goes on inside the Amiga in a single volume. Explains in detail the Amiga chips (68000, CIA, Agnus, Denise, Paula) and how to access them. All the Amiga's powerful interfaces and features are explained and documented in a clear precise manner. 450 pages.

Topics include:
- EXEC Structure
- Multitasking functions
- I/O management through devices and I/O requests
- Interrupts and resource management
- RESET and its operation
- DOS libraries
- Disk management
- Detailed information about the CLI and its commands

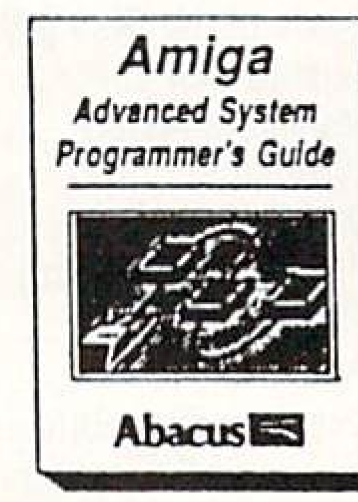


PRICE: £29.95

Advanced System Programmer's Guide

A follow up volume to the internals of the Amiga covering even more topics incuding Kickstart and Workbench 1.3. Presents the conventions for systems programming. Very thorough explanations of accessing the facilities provided by the libraries, input and output using the Devices, using and changing the preferences. Describes the various strandard IFF formats - graphics, text and music. 560 pages.

Topics include:
- Interfaces – audio, video, RGB, Centronics, serial, disk access, expansion port, keyboard.
- Programming hardware – memory organisation, interrupts, the Copper, Blitter and disk controller.
- EXEC Structures – Node, List, Libraries and Tasks.
- Multitasking – Task switching, intertask communication, exceptions, traps and memory management
- I/O – device handling and requests
- DOS Libraries – functions, parameters and error messages
- CLI – detailed internal design descriptions
- Devices - Trackdisk, Console, Narrator, SER, PAR, PRT, and gameport

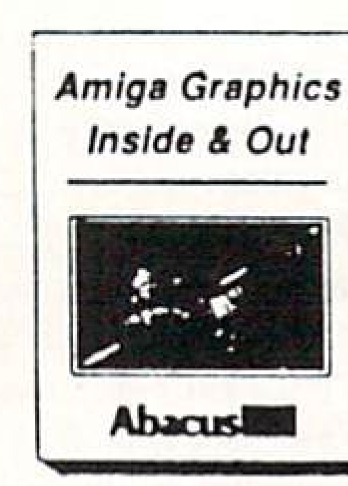


PRICE: £29.95

Amiga Graphics Inside & Out

This book will show you simply and in plain English the super graphic features and functions of the Amiga in detail. You will learn the graphic features that can be accessed from AmigaBASIC or C. The advanced user will learn graphic programming in C with examples of points, lines, rectangles, polygons, colours and more. Includes a complete description of the Amiga graphic system – View, ViewPort, RasPort, bitmap mapping, screens and windows.

Topics include:
- Accessing fonts and type styles in AmigaBASIC
- CAD on a 1024 x 1024 super bitmap using graphic library routines
- New ways to access libraries and chips from BASIC – 4096 colours at once, colour patterns, screen and window dumps to printer
- Graphic programming in C – points, lines, rectangles, polygons, colours
- Amiga animation explained including sprites, bobs and AnimObs, Copper and bitter programming.



PRICE: £29.95

OPTIONAL DISKS £9.95

Save hours of typing. Disks are available containing all programs listed in the books. In addition, runtime versions of C and Assembler programs are usually provided on the disk.

SPECIAL OFFERS - end 10/6/90

- Purchase any two of the above books for £55
- Purchase all 3 books for £75
- Book plus corresponding disk for £37.50
- Two books plus disk for £70
- Three books plus disks for £92.50

All other Abacus books available. Send SAE for full details or phone for current prices. Trade enquiries welcome.

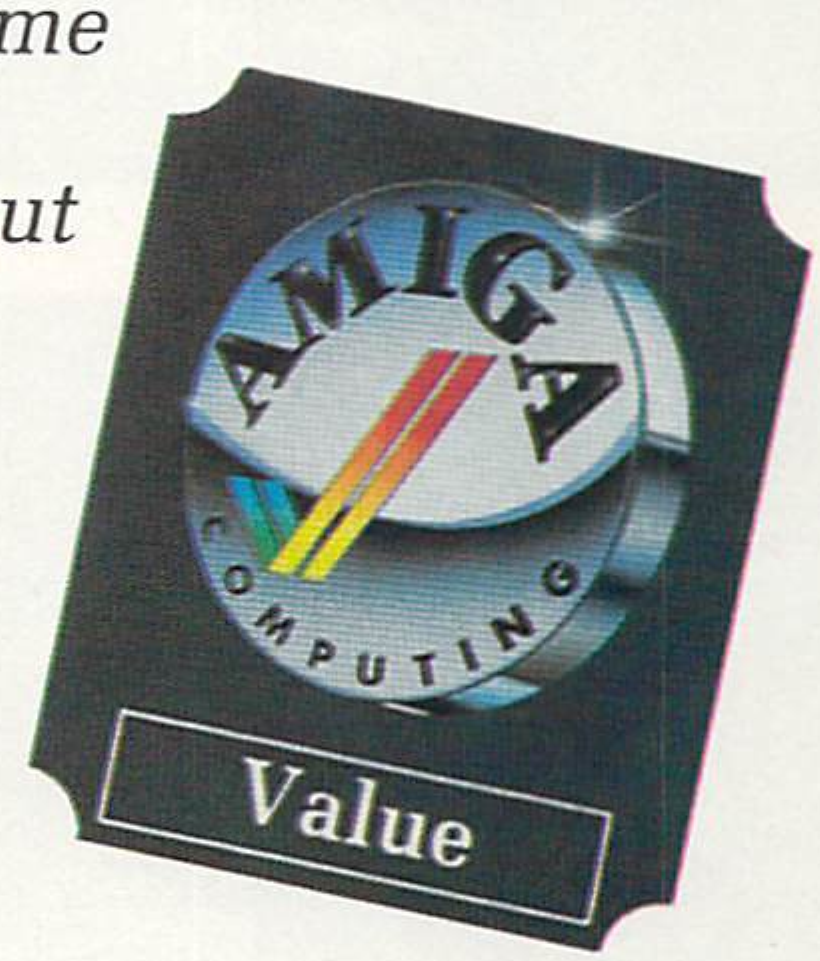
Post free in UK £1 per book for Europe + service mail worldwide
£5 Airmail outside Europe

ADAMSOFT Dept AC
18 Norwich Avenue, Rochdale, Lancs OL11 5JZ
Tel: 0706-524304 (9am to 10pm Mon-Fri)



Off the record

If the sampler didn't exist, neither would 99 per cent of all demos. That's probably grounds enough to ban them outright, although with some skill, a little panache and a large music collection to borrow sounds from, a sampler can become a wonderful device – as Stewart C. Russell finds out



REMEMBER the 8 bit days when it was quite a novelty for a game to have sampled sound? For the software house to boast that you could discern the accent of sampled speech? These days, now that we are older and wiser, it would create a stir for a game *not* to have sampled sound.

So what is a sampler? Far from being a magical device which instantly imparts musical skill (see House Music) it's actually a dull little electronic circuit which measures voltages and records them in the computer's memory.

If the voltage happens to come from a tape player stumbling through Stock, Aitken and Waterman, the portion of memory can be replayed to create a noise that is almost, but not quite, entirely unlike music.

➤

The faster the sampler stores the voltages, and the larger the number of bits used to represent the voltage, the better the sample quality. Or not, as in the case of Stock, Aitken and Waterman.

Master Sound is a clever little sampler from a bunch of guys who have been making waves with their samplers for the ST. It can do two technically impossible things – it can sample to fast ram, and it can sample and replay faster than Paula, the sound chip, can handle.

Fast ram, which is present on machines with more than 1 meg, cannot be accessed by the custom chips. Most (middle aged) Amigas have only 512k of ram that the sound chip can talk to, so samples were of a limited length, around 130k.

By using the main processor to throw memory at the sound chip, Master Sound can use as much fast ram as you can get – yes, up to 8 megabytes of sampling space! I only found one sample player that could handle these overlong samples, so they are best kept for use with Master Sound.

Paula can only replay sampled sounds at a maximum of 28,000 samples a second (28 KHz), but she requires no intervention from the processor. By using the processor exclusively, Master Sound burps out the bits at 55.9 KHz, which is actually faster than compact discs are sampled. This makes for very sharp samples, but only Master Sound and a very few other packages will be able to replay them at the correct speed.

The main Master Sound screen looks like a cross between a CD player, an oscilloscope and a very cheap sci-fi movie – all silver buttons and drop shadows.

A small oscilloscope on the bottom right of the screen is used to set the input volume. Too quiet and the sample will hiss, too loud and it will buzz and click. Once the volume's set, you can start recording; a click of the mouse and whatever you've got plugged into the cartridge will start making a noise through the speaker.

Once you've sampled all you want – or, more likely, run out of sampling space – you can replay your sample forwards, backwards, at speeds



For reasons known only to the authors, Master Sound includes a real time sample sequencer. This allows 18 samples to be stored in memory and recorded to create a four channel sequence. This sequence can only be edited by ear and must be produced in real time. It's not very easy to use. Sequence fiends would be well advised to go for a PD sequencer like MED (Fish Disk 255), an AmigaDos-friendly SoundTracker clone which also loads IFF sounds.



Once you are happy with your sample you can save it out as raw data for use with SoundTracker and its many clones, as an Aegis Sonix instrument in one, three or five octaves, or as a plain IFF 8 bit sampled sound (8SVX) which can be read by everything except #?Tracker. Samples can be loaded in in any of these formats and can be edited for further enjoyment.

Up to 7 issues FREE!

(worth £17.50)

...not forgetting the monthly cover disc!

AMIGA COMPUTING

Yes – you will only pay for 24 issues when you take out a subscription for the next 31 issues of Amiga. ***That's SEVEN issues completely free.***

And if you take out a 15 month subscription we'll only charge you for 12.

What's more, as a subscriber you'll also be able to take advantage of our exclusive money-saving offers which will be posted to you every month.

But note: This particular offer MUST end on May 31 – so complete the form alongside and return it without delay!

Note to current subscribers:
We haven't forgotten you! If you would like to take advantage of this extra special offer you may renew your subscription early. It will then be extended accordingly.

To place your subscription, please use this order form

ORDER FORM

Valid to May 31, 1990

Please tick the appropriate box

15 MONTH SUBSCRIPTION (UK only)

Subscription		New	Renewal
UK (with cover disc)	£29.95	9562	9563
UK (without disc)	£24.95	9578	9579

31 MONTH SUBSCRIPTION (UK only)

Subscription		New	Renewal
UK (with cover disc)	£59.95	9564	9565
UK (without disc)	£49.95	9580	9581

12 MONTH SUBSCRIPTION (outside UK)

Subscription plus cover disc		New	Renewal
Europe & Eire	£34.95	9543	9544
Overseas (Airmail)	£49.95	9545	9546

24 MONTH SUBSCRIPTION (outside UK)

Subscription plus cover disc		New	Renewal
Europe & Eire	£63.95	9549	9550
Overseas (Airmail)	£91.95	9551	9552

Only subscription applications received by Wednesday, April 25 can be guaranteed to start with next month's issue.

Payment: please indicate method (✓)

☐ Cheque/Eurocheque made payable to Database Publications Ltd.

☐ Access/Mastercard/Eurocard/Barclaycard/Visa/Connect Expiry Date ___ / ___

No. ____________________

Name ____________________ Signed ____________

Address ____________________

____________________ Post Code ____________

Daytime telephone number in case of queries ____________

Send to: Database Direct, FREEPOST, Ellesmere Port, South Wirral L65 3EB (No stamp needed if posted in UK)

Order at any time of the day or night

Don't forget to give your name, address and credit card number

Orders by phone: 051-357 1275

Orders by Fax: 051-357 2813

Orders by MicroLink: MAG001

General Enquiries: 051-357 2961

AM5

➤
ranging from 3 KHz to 55.9 KHz, once, or in an infinite loop.

Considerable simple enjoyment can be had speeding things up (Pinky and Perky come back, all is forgiven) or playing things backwards to see what is hidden in back-tracks.

More serious work involves cutting, overlaying and reversing samples, filtering out unwanted noise, boosting volume levels and putting a fade in/out on a sample to reduce the click you get at the ends of badly cut samples.

These all work well, although too much filtering hides the sound behind thicker and thicker layers of socks, and too much volume just makes fuzz. The software can start recording once the input volume exceeds a user-set level – great for ignoring lead-ins.

Because Master Sound samples in mono only, you can redirect the sound to the left or right speaker and, while you're at it, toggle the Amiga's built-in filter. This filter, not present on A1000 machines, can either clean up a sample beautifully or make it sound like it has been buried in a laundry basket.

The Master Sound cartridge, although quite small, sticks out by a good four inches from the parallel port and isn't secured to the machine. Although it's a good fit, if the sampler came off it would probably fry both itself and the Amiga. Be careful.

YOU'LL also need to buy a cable to connect it to something like a tape or CD deck. Once that's fitted, the sampler sticks out even more. There's no through port, so you'll have to say goodbye to Mr. Printer while you are sampling. A1000 owners will, as usual, have to make use of a gender changer to use Master Sound.

Samplers in Master Sound's price bracket are usually dire. But as long as you are careful with volume levels and where you run cables, Master Sound creates beautifully clear samples which replay with a clarity and accuracy usually found on far more expensive samplers.

The advertising types have probably already used "Is it real or is it Master Sound?" But for once it is true. Honest.

REPORT CARD

Master Sound
Microdeal 0726 68020
£39.95

EASE OF USE....
The sampler works just like a tape deck; no problems. The seqencer, however, stinks.

SPEED ....
Very high sampling rates are possible and all the functions take a very few seconds to complete.

VALUE ....
Just about the cheapest sampler. Just about the best quality. No stereo, but that we can live without.

OVERALL 93%
Those about to sample, should have Master Sound. It's cheap and it works extremely well. Recommended.

SPECIAL OFFERS

3.5" BULK DISKS
FULLY CERTIFIED,
TOP QUALITY PRODUCT
36p inc VAT with free labels

DISK STORAGE

3½" 80 CAP – £3.35
3½" 120 CAP – £6.00
5¼" 50 CAP – £2.97
5¼" 100 CAP – £3.50
★ ★ 3½" POSSO BOX ★ ★
ONLY £13.35

ACCESSORIES

Boxed Mouse Mats £1.85
Mouse Holders £0.95

11" x 9.5" single part plain paper boxed 1000's .... £7.95 per pack

RIBBONS
Low Price Special

Amstrad 8256/8512	£3.50
Amstrad LQ 3500	£3.90
Star LC10	£2.90
Star LC10 - Colour	£6.95
Star LC24 - 10	£3.95
Epson LX80/86	£2.75
Epson MX80/85 FX800/LX800	£2.79
Epson LQ800/850 /500	£3.49
Citizen 120D/LSP10	£3.75
M. Tally MT80/81	£3.99
M.Tally MT85/87	£4.95

We also stock acoustic hoods for all of the above printers – phone for price.

This is a very small selection from our large range of compatible ribbons – if you don't see the ribbon required – Ask!

IMMEDIATE MEDIA

IMMEDIATE·MEDIA (CAMB) LTD

11 ORTON HIGH TECH CENTRE, BAKEWELL ROAD,
ORTON SOUTHGATE, PETERBOUOUGH PE2 0XU
TEL: (0733) 371617 FAX: (0733) 370489

All prices exclude VAT & carriage. E + UE.

ARK

TEL: 0983 79 496

ACCOUNTS

Arena Int. Accounts 1MB	119.83
Cashbook Controller	39.79
Cashbook Combination	59.80
Desk Top budget	34.96
Home Accounts	23.92
Panmead Modules	39.79
Personal Accounts Plus	29.90
Personal Tax Planner	34.96
Small Business Xtra 1MB	89.93
System 3 Integrated	44.85

BOOKS

Please call

COMMUNICATIONS

A Talk 3	69.92
BBS PC	88.78
K Comm 2	24.84

COMPUTER AIDED DESIGN

Design 3D 1MB	57.96
Professional Draw 1MB	99.82
X Cad Designer 1MB	79.81

DATABASE MANAGERS

Data Retrieve Pro 1MB	179.86
Mailshot Plus	37.95
Microfiche Filer	49.91
Prodata	57.96
Race Horse Form Master	39.79
Superbase Professional 1MB	164.91
Superbase Personal	39.79
Superbase Personal 2 1MB	62.79
Who What When Where	29.90

DESKTOP PUBLISHERS

PageSetter 2 1MB	74.98
Pagestream 1MB	129.95
Professional Page 1.5MB	179.86

EDUCATION

GCSE Tutors	24.84
My Paint	34.96

EDITORS

CygnusEd Professional	69.92

GRAPHICS

Animagic Editor 1MB	54.97
C Light	39.79
Comic Setter 1MB	39.79
Deluxe Art Parts Vol. 1	9.89
Deluxe Paint 3 1MB	57.96
Deluxe Video3 1MB	79.81
Digi Paint 3	49.91
Elan Perfomer	44.85
Impact Presentations	49.91
Lights, Camera, Action 1MB	47.84
Movie Setter	51.98
Photon Paint 2 1MB	57.96
Pixmate	38.87
Professional Draw Clip Art	44.85
Sculpt 3D XL 1MB	99.82
Sculpt 4D Prof.1MB	329.82
Sculpt Animate 4D Junior	84.87
The Director	39.79
Turbo Silver	99.82
Zoetrope 1MB	79.81

HARDWARE

1.3 A5000 Kickstart ROM	29.90
1MB MiniMax A500 RAM	199.87
3..5" NEC Drive Switch/Thu	68.77
512K A500 RAM Clock/Switch	69.92
A Max Mac Emulator No Roms	109.94
A4 Flat Bed Scanner	459.77
A590 20MB Hard Disk Drive	379.96
A.M.A.S. Sound Sampler	77.74
Digi View Gold 4	119.83
MasterSound	34.96
Midi Master Interface	34.96
Minigen Genlock	99.82
Vidi Amiga PAL Digitiser	99.82

PACKAGES

Appetizer	29.90
Graphics Starter Kit	54.97
Home Office Kit	99.82
Publishers Choice	68.77
Starter Kit	59.80
The Works Platinum	129.95

PROGRAMMING

Aztec C Professional	109.94
Benchmark Modula 2	119.83
Devpac 2	42.78
GFA Basic Compiler	28.98
GFA Basic Interpreter	39.79
Hisoft Basic Compiler	57.96
Lattice C 5 Complete	169.97

SOUND

Deluxe Music Const. Kit	52.90
Instant Music	22.77
Music X	169.97
Music X Junior	89.93
Sonix	39.79
Studio Magic	49.91

SPREADSHEETS

Advantage	79.81
DGCalc	31.97
Superplan 1MB	67.85

UTILITIES

AmigaDOS Toolbox	39.79
Amikit For Beginners	29.90
ARexx Macro Interpreter	34.96
Award Maker Plus	34.96
B.A.D. Disk Optimiser	31.97
BBC Emulator	34.96
Calligrapher Font Designer	64.86
CanDo Environment	109.94
CrossDOS File Transfer	29.90
Disk Master Housekeeper	39.79
DOS 2 DOS File Transfer	29.90
Enhancer 1.3 S/WUpgrade	14.72
Facc 2 Disk Cache	23.92
Kara Sub Head Fonts	49.91
MAC 2 DOS File Transfer	69.92
Masterpiece Fonts (110!)	129.95
Mavis Beacon Typing	27.83
Project D Backup/Editor	31.97
Superback 2 H/D Backup	39.79
Ultracard Plus	69.92
Virus Infect. Protection	34.96
Wordperfect Library	89.93
X Copy 2 Backup/Editor	17.94
Your Family Tree Gen.	34.96

WORDPROCESSORS

Kindwords 2	35.88
Outline	29.90
PenPal	99.82
Protext	64.86
Scribble (Platinum)	41.86
Transcript	32.89
Wordperfect	164.91

Richard Howe & Angela Hammett
Applied Research Kernel
Corve Farmhouse, Chale Green, Ventnor, PO38 2LA, U.K.

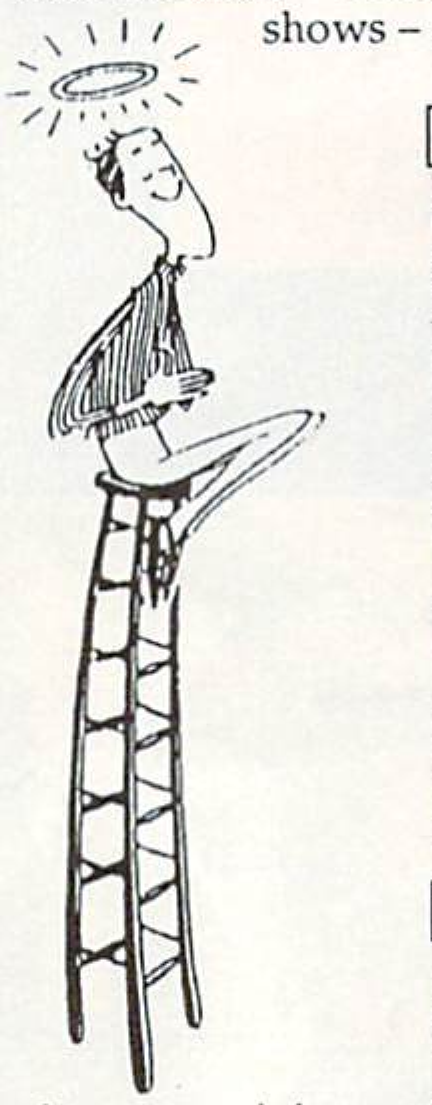
POSTAGE: UK Free. Europe £4. World £10
CHEQUES: London Sterling Payable to A.R.K. please
EXPORT & BFPO: Remove U.K. V.A.T. (=Price/1.15)
V.A.T.: All prices include U.K. V.A.T. at 15%
PHONE: Monday to Saturday 9.30-6-30pm
DESPATCH: Usually within 48 hours
PRICES: Are subject to change

Reach the top with . . .

LCL
Self-Tuition Courses

NEW

World leaders – Hons graduate/teacher authors – At all major shows – £5 off total for 2, £10 off for 3



MICRO MATHS

Complete course taking beginners to GCSE in 24 programs on 59 topics + 2 books. £24 (Amiga, ST, PC, PCW, CPC, BBC)

MICRO FRENCH

Complete course taking beginners to GCSE, with real speech & graphics adventure game, 24 programs + 2 books. £24 (Amiga, ST, PC, BBC).

MICRO ENGLISH

Complete course taking age 8 years to GCSE English Language, with real speech. Also for EFL. It covers punctuation, spelling and much more. 24 programs and 2 books at £24 (Amiga, PCW, CPC, BBC).

MICRO COLLEGE

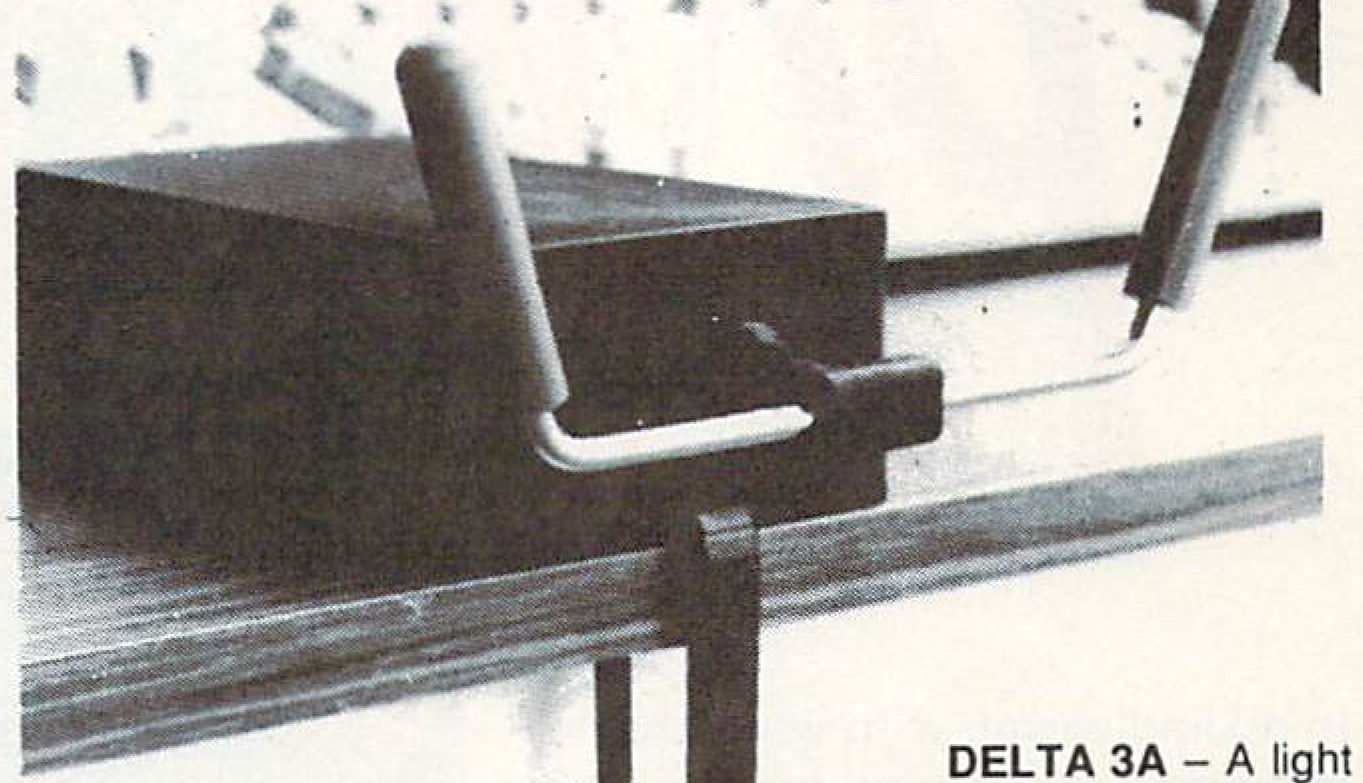
Micro maths, French or English with VHS video £49.99 (Amiga, ST, PC, PCW, CPC, BBC).

Send coupon and cheques/PO's or phone orders or requests for free colour poster/catalogue to:

LCL (DEPT AMC) THAMES HOUSE, 73 BLANDY ROAD,
HENLEY-ON-THAMES, OXON RG9 1QB

or ring 0491 579345 (24 hrs)

Name ....
Address ....
Title ....
Computer ....



DELTABASE A – Analogue Yoke joystick for Flight Sim II. Similar to a light aircraft control it rocks from side to side for aileron movement and slides in and out for elevator controls. £29.95

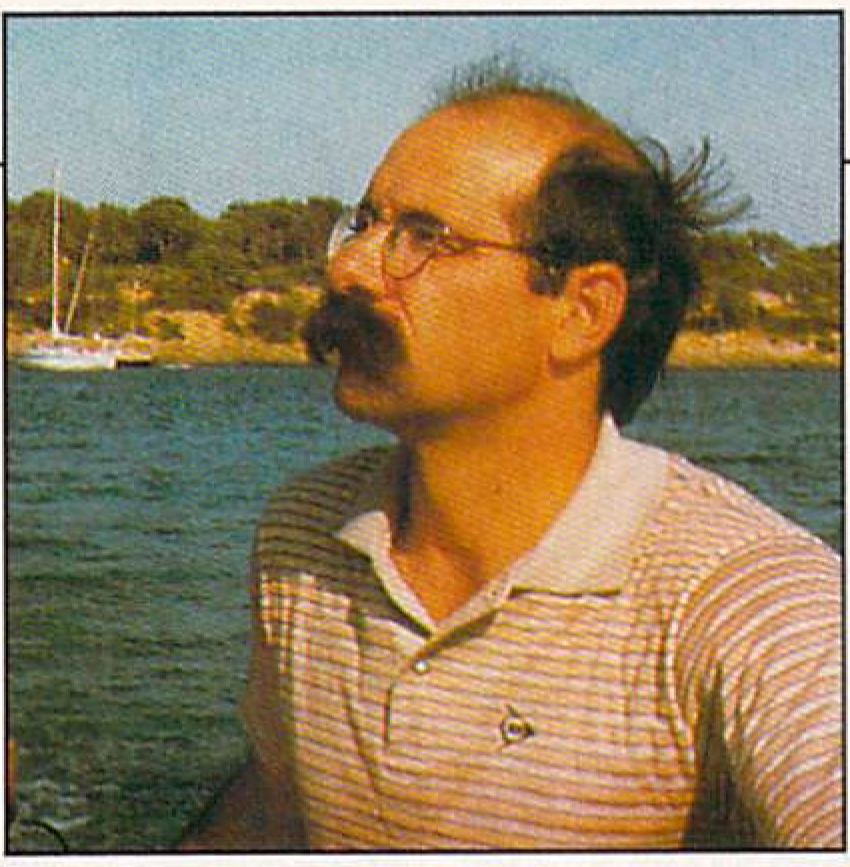
DELTA 3A – A light action analogue joystick with fire buttons. Introduced so that software companies can produce the software to use it. Meantime this also will only run flight Sim II. £14.95

DELTA 3S – A unique fast light hand held switched joystick with fingertip control which will have you still nipping around the screen, when the upright/sucker brigade are nursing their aching wrists. £14.95

AMI-CAT – Mouse eliminator joystick for where a suitable surface cannot be found, AMI-CAT will provide variable speed control of mouse software. If you point the stick, the mouse pointer/cursor etc will move in that direction. The speed is proportional to the degree of deflection. When the stick is released the mouse pointer remains stationary. £29.95

VOLTMACE

Unit 9, Bondor Business Centre, London Road, Baldock, SG7 6HP
Telephone 0462 894410
Prices include VAT & 1st class post
Dealer & Distributor terms available





Portfolio

SPANISH-born Sebastian Marquez moved to Sweden 15 years ago at the age of 27. He's lived in Stockholm ever since and is presently working in a school teaching 11-year-olds.

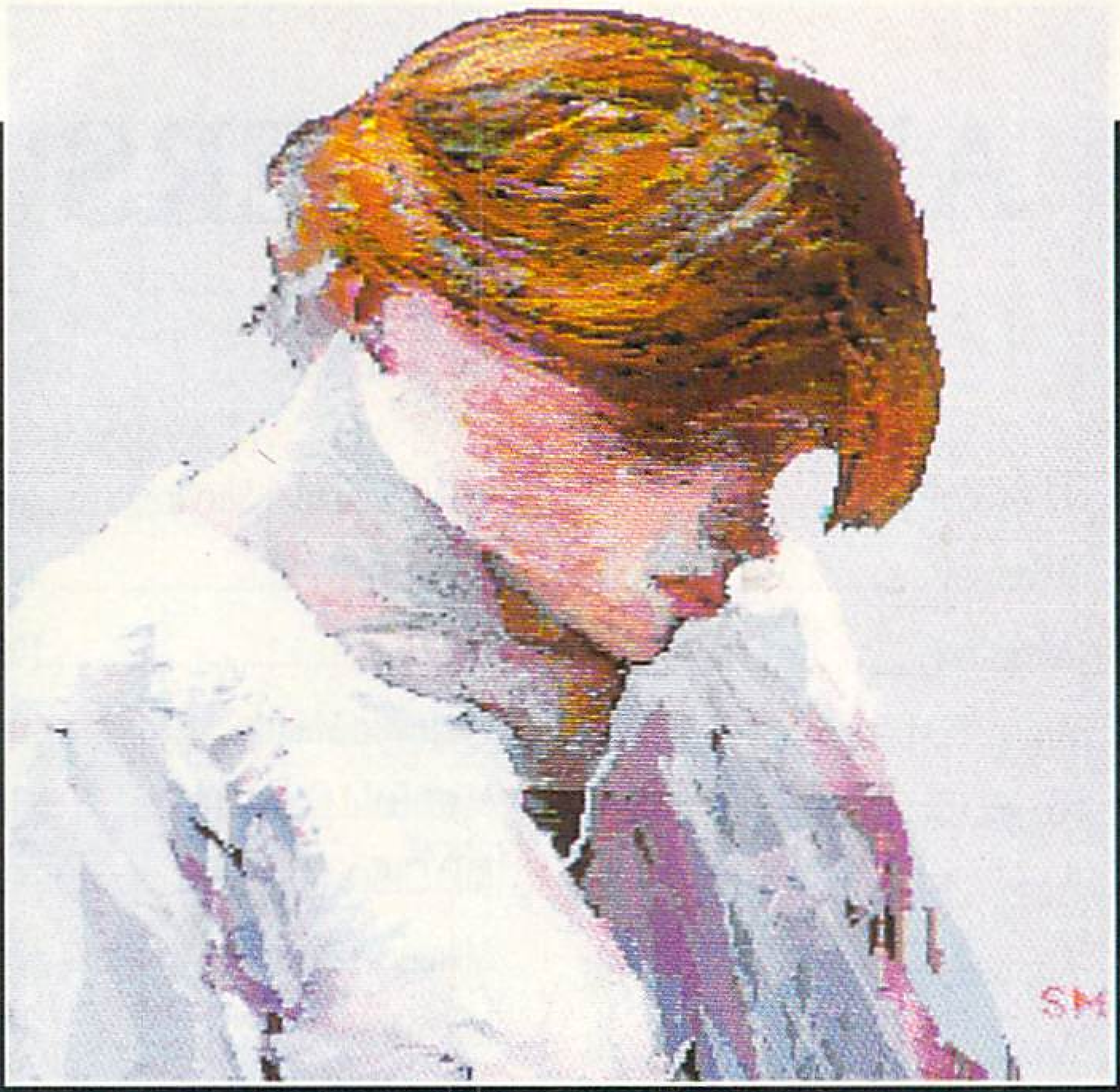
They have an Amiga in the classroom, which is used mainly for painting, word processing and maths in that order. But no matter what Sebastian asks his pupils to do, they enjoy it more if it can be done with the Amiga. He has even written a few programs to fit the special needs of the kids he works with.

Sebastian used to paint on canvas in oil and pastel, with which he has had many exhibitions, but has recently defected to Photon Paint and the HAM computer screen as his media. He mixes and uses colours exactly as he used to on canvas, and admits that it is just as difficult and time consuming as before. But once the painting is finished, he says it is a dream how you can manipulate it.

Painting and teaching are not Sebastian's only talents, for he likes nothing better than to take things a step further and animate his paintings. In one of his animations he makes the moored boats bob around on a choppy sea using the same techniques that professionals employ to produce animations like Captain Pugwash.

COMPANIES or individuals wishing to commission any of our Portfolio artists should in the first instance contact the *Amiga Computing* offices.
Tel: 0625 878888
Fax: 0625 879966









Contributions, on disc please, to: Portfolio, Amiga Computing, Europa House, Adlington Park, Macclesfield SK10 4NP



ADVERTISERS' INDEX

17 Bit Software........30
Adamsoft........96
Amigatex........105
Amiga PD Library........99
Amiga Users Group........71
Anco........66
Applied Research Kernel........101
Arnor........92
Ashcom........100
Bytes & Pieces........70
Castle Software........95
Computer Store........76
Computerwise........104
Contriver Europe........23
Database Software........96
Datel Electronics........6, 7, 8, 9
Diamond Computers........106, 107
Digicom........73
Digita International........10
DT Distribution........96
Entertainment International........116
Evesham Micros........72
Hampshire Micro Computers........24
Harris Hi-Tek........87
Hi-Soft........35
Home Based Business........104
HSV Computer Services........69
Infogrames........2
L.C.L.........101
Magnetic Media........104
Mansfield Computers........88
MD Office Supplies........49
Memory Expansion Systems........20
Microsnips........61
Microtext........71
Overseas Media........3
Power Computing........15, 16, 17
Purple PD Software........31
Rombo........89
Sabre Technologies........95
Shield Computer Services........114
Silica Shop........115
Siren Software........84
SK Marketing........18
Softmachine........30
Softsellers........32
Special Reserve........28
Third Coast Technologies........93
Trilogic........33
Turbosoft........87
Video Productions........24
Voltmace........101
WTS Electronics........114

ArgAsm

Probably the fastest assembler ever for the Amiga!

When you're developing software, the last thing you want is to hang around for ages while your assembler processes your code – when you could be getting on with further program development.

But now all that waiting's a thing of the past, because ArgAsm from Argonaut Software is a revolutionary machine code development system.

It assembles at an incredible rate of 250,000 lines a minute! – at least five times faster than anything else, and over 100 times faster than the original Commodore assembler – and it remains fully compatible.

What's more, ArgAsm is the first assembler to be compatible with all the three major assemblers; Assem, Devpac and Cape. So if you're looking to upgrade, the chances are you'll be instantly right at home with ArgAsm.

And for a limited period we're exclusively knocking £5 off the recommended price.

If you're serious about producing professional quality software – fast, this is THE assembler for you. But remember, this is a limited offer, so to be sure of your copy place your order today.

Exclusive price for readers of AMIGA COMPUTING

£54.95

RRP £59.95

SAVE £5!

ASSEMBLER	EDITOR
✔ Fast one-pass design	✔ Multi tasking
✔ Code limited only by memory	✔ Full multi-file capability
✔ Unlimited number of labels	✔ Unlimited split views of files
✔ Long label names	✔ Cut/paste between windows
✔ Unlimited macro nesting	✔ Insert/delete blocks etc.
✔ Unlimited include nesting	✔ Full configuration facilities
✔ Include binary data	✔ Save/restore environment
✔ Extra-helpful error messages	✔ Extremely fast text scrolling
✔ Instruction cycle timings	✔ Fast page update rates
✔ Processor flag display	✔ Assemble from any window
	✔ Works on Workbench screen

Place your order today, using the form on Page 113

Your AMIGA 500 IS worth over £800!!

When you part exchange it for a B2000 with an autoboot hard disk!

Phone or call in to a Diamond store for details!

RENDALE 8802 GENLOCK
£189 inc VAT

FLICKER FIXER
£259

8Mb RAM BOARD (2Mb pop)
£295

AMIGA 2090A
Hard disk + controller card also Boot and Fast File for Amiga 2000
£349 + VAT
£299 without hard disk

A590 20Mb
Hard disk with 2Mb RAM
£499 inc VAT



47Mb Autoboot, Fast file System Hard Disk for B2000 - only 395

HIGH QUALITY 3.5" BULK DISKS

Inc VAT	INC vat
10	£7.00
25	£13.00
50	£25.00
100	£48.00
200	£94.00

Add £4.95 for 80 capacity lockable box

Diamond Configured Packs:

AT System
Amiga B2000
AT Bridgeboard
2090A 20Mb Autoboot HD
1084 Colour Monitor

XT System
Amiga B2000
XT Bridgeboard
2090A 20Mb Autoboot HD
1084 Colour Monitor

Basic System
Amiga B2000
2090A 20Mb Autoboot HD
1084 Colour Monitor

Audio System
Amiga B2000 + 2090A
1084 Colour Monitor
Music X & Midi Interface

Visual System
Amiga B2000 + 2090A
A2300 Genlock
TV Text & TV Show

Phone for our incredibly low prices on the above systems!

SUPERPIC

Genlock + Real Time Frame Grabber
£489

CHIP SHOP PRICES NEW CHIPS ONLY

A590 CHIPS

0.5 MB	1 MB	2 MB
£29.95	£59.75	£119.00
Inc VAT	Inc VAT	Inc VAT

A590 £319.00

A590 2 MBYTE POPULATED
£499 inc VAT!

8UP BOARD CHIPS

2 MB	4 MB	6 MB	8 MB
£99.00	£195.00	£290.00	£385.00

8UP BOARD
ONLY £160.00

8UP BOARD 2MB
POPULATED £249.00

PRINTERS

All printers in our range are dot matrix and include the following features...
Standard centronics parallel port for direct connection to Amiga, PC's, ST, Archimedes etc. Tractor and friction paper feeds.

CITIZEN SWIFT-24 £259

WITH COLOUR £295

PANASONIC KXP-1124
24-PIN D.MATRIX PRINTER £159

OKIMATE 20
24-PIN COLOUR THERMAL DOT MATRIX PRINTER £119

STAR LC-10 MONO
Multiple font options from front panel, excellent paper handling C64/128 version available £159

STAR LC-10 COLOUR
Colour version of the popular LC-10, allowing the effect of full colour on screen dumps (requires colour printer driving software). C64/128 version available

STAR LC-24-10 £199
24 Pin version of the popular LC series with exceptional letter print quality.

STAR XB 24-10
24 PIN COLOUR PRINTER
(INCLUDES COLOUR OPTIONS) £439

MONITORS

PHILIPS COLOUR VISION MONITOR
£159.00

PHILIPS 8833 (U.K.) COLOUR MONITOR WITH STEREO SOUND
ONLY £199.00
(INC. ON SITE MAINTENANCE)
PHILIPS PREMIER SERVICE

DIAMOND MULTISYNCH MONITOR
ONLY £295.00

COMMODORE 1084 MONITOR
ONLY £199.00

ALL PRICES EXCLUDE VAT. COURIER £5, NEXT DAY SERVICE £10.

E & OE. All prices correct at time of going to press and are subject to change without notice.

Reader offers

Mavis Beacon Teaches Typing

SAVE £5

Learn to type quickly, easily and perfectly – the fun way!

This is an artificial intelligence software system from the writers of Chessmaster 2000 – winner of the US Chess Federation Computer Chess Championship.
It checks your progress lesson by lesson, every step of the way, through a typing course tailored to your individual needs.
Mavis makes the learning fun when creating your lessons by selecting quotes from history's greatest writers, countless riddles, rhymes, jokes and hundreds of fascinating facts from the Guinness Book of World Records
If you feel your typing could be better, this is the ideal way to learn!

RRP £29.99
OUR PRICE
£24.99

AMIGADOS: A Dabhand Guide

Is a comprehensive guide to the Commodore amiga's disc Operating System (Versions 1.2 *and* 1.3). It provides a unique perspective on this powerful system in a way which will be welcomed by the beginner and the experienced user alike.

Rather than simply reiterating the Amiga manual, this book takes a genuinely different approach to understanding and using the Amiga and contains a wealth of practical hands-on advice and hints and tips.

The many features of this book include:

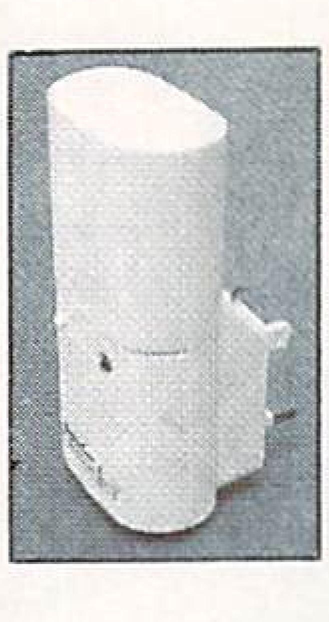
- Full coverage of Amiga DOS 1.3 functions
- Filing with and without the Workbench
- The Amiga's hierarchical filing system
- Pathnames and Device names
- The Amiga's multitasking capabilities
- The AmigaDOS screen editor
- AmigaDOS commands
- Batch processing
- Amiga Error code descriptions
- How to create new systems discs
- Use of the RAM discs
- Using AmigaDOS with C

Amiga Computing approved reading



£14.95

SAVE on batteries



For you personal stereo, radio or TV

You know how expensive it is to replace your batteries when they run down. Even with rechargeable batteries you still have to wait 14 hours for full charge. We have solved the problem with the unique superfast powerful battery and charger kit.
This amazing device will completely charge four standard AA size rechargeable batteries in under 2 hours and each battery can be recharged at least 1,000 times.
Further, for a limited period we can sell the charger and four rechargeable batteries at the staggering low cost of £19.95 (plus £1 p&p).

It will pay for itself within weeks!

Publishers' Choice

SAVE £20

Whether you are designing a simple flyer, creating a newsletter, banners, posters, or even producing a magazine, Publisher's Choice offers a comprehensive solution to your Desktop Publishing and presentation requirements.
With the program you can easily combine text in a variety of styles, in multiple columns and with customised graphics. It comes with over 200 professionally designed images, and high quality "Headline" fonts.
In fact, Publishers' Choice combines the Kindwords 2.0 wordprocessor, PageSetter 1.2 page composition package, Artists' Choice art program, and the Headline fontpack.
Because the Amiga is multi-tasking you can have all the programs working on the screen at the same time, or just use them individually as powerful stand-alone programs.

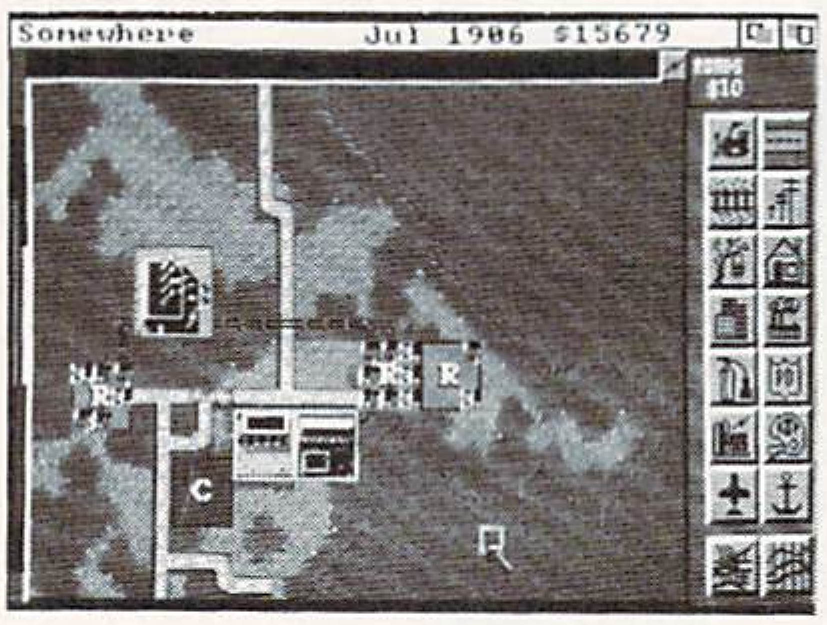
RRP £99.99
OUR PRICE
£79.99

TO ORDER PLEASE USE THE FORM ON PAGE 113

LET THERE BE *COLOUR*

Once upon a time there were two drawbacks to video digitising on the Amiga. Either it was slow or it was expensive. Thanks to a price breakthrough from Rombo, you can now produce good colour images quickly and cheaply. Thanks to Amiga Computing and Rombo you can get the high specification PAL VIDI digitiser and Vidi Chrome colour software for only **£119.95.**
The award winning Vidi digitiser connects to a black and white or colour video camera to grab mono pictures instantly and uses a series of filters combined with a camera to produce startlingly realistic HAM colour images.

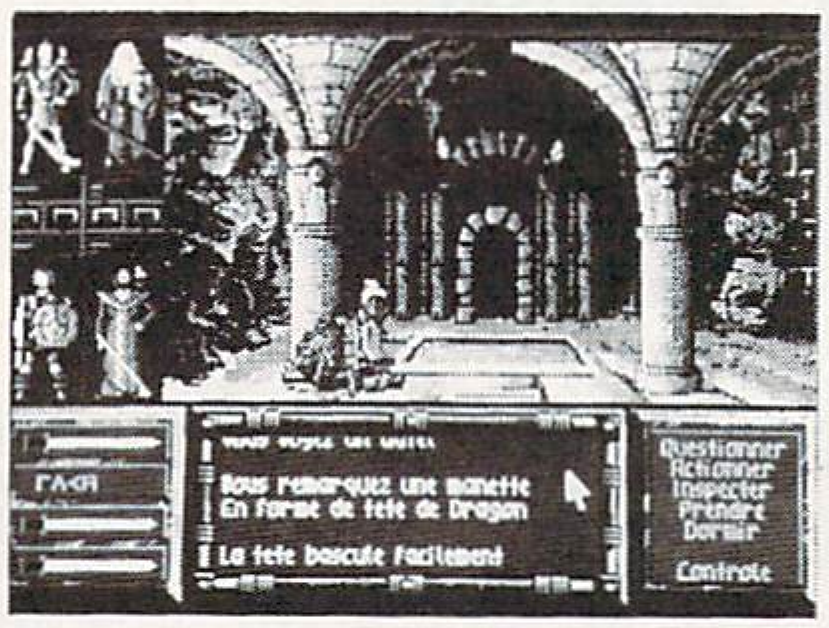
SAVE £15



SIM CITY

You are in control of a city. Build the metropolis. Live your imperialist dreams. Can you rule for 100 years? The thinking man's Populous. ***SAVE £5!***

RRP £29.99
OUR PRICE
£24.99



DRAKKHEN

The fate of the world lies in your hands. Magic, animation and monsters add up to a game which no role-playing enthusiast should miss. ***SAVE £5!***

RRP £29.99
OUR PRICE
£24.99

Buy both and save £15!

PLEASE USE THE ORDER FORM ON PAGE 113

Reader offers

EXCLUSIVE! SAVE £20

RRP £99.95
OUR PRICE
£79.95

Just how good is Protext?

'...merely the best wordprocessor for the Amiga' – *Reveiwed in Amiga Computing, January 1989*

Protext is acknowledged by many as THE word processore for most home micros, and the Amiga version is no exception. /What you get with Amiga Protext is a powerful workhorse with a proven track record. Plus a saving of £20 off the retail price of the new version 4!

- Automatic reformatting of text
- Page breaks shown during editing
- Can spell check as you type
- Over 70,000 word English dictionary
- Macro record mode
- Footnotes
- Menu driven configuration program
- Auto indent for program editing
- Line drawing
- Fast and flexible find and replace
- Powerful mailmerge facility
- Box mode for creating columns
- Edit two files at a time
- Keyboard or mouse operation

Press comments

"For power and value for money, I don't think that Protext can be beaten. It can be used as simply as you choose, or can handle the most complex mailmerge routines... in short, it can be what you want it to be". – **Micronet**

"Anyone with a professional interest in words is likely to find it pays dividends". – **PC Business World**

"It is a refreshing change to review an inexpensive WP package which lives up to every expectation". – **Which PC**

"Protext deserves to be the system by which all other word processors are judged". – **Your Computer**

"The great strength of the package is its ease of use". – **CPC Computing**

"Deserves very serious consideration". – **Amstrad Professional Computing**

Keyboard dust cover (A500) £4.95



Protect your Amiga with this top-quality cover made from clear, water-resistant vinyl. It's bound with strong cotton and features the Amiga Computing logo.

Binder £5.95



Twelve rods hold your issues in place and keep them in pristine condition in this smart PVC binder.

Mouse mat £6.95

The perfect desktop environment for your mouse with its specially-designed, perfect-grip surface. It ensure much smoother movement, gives super-positive control and protects your table top from scratches.



Disc storage box £4.95

This luxury padded box is the ideal storage medium, holding up to FIFTY 3.5" discs

Need some extra discs?

There's always a demand for spare Amiga discs – and at Amiga Computing we have lots we will be happy to sell off at a really exceptional price. They are all discs that have been prepared as monthly cover discs, but they are brand new and have never been used, so you can safely reformat them and use them for any purpose you like. Look at these prices:

5 for £7.50! **25 for £20!**

Pow!

Batman the Movie computer game at a knock-out price

Only £14.95

Home Accounts — Day by Day

Home Accounts has been designed to make full use of the Amiga's features, giving you the widest range of home accounting facilities available at this price.

RRP £54.90
OUR PRICE
£34.90

The program lets you set budgets and control up to 13 separate accounts, with optional printouts of any data. Within seconds of loading you data disc you can check your budget or any account, and even display or print the data in bar or pie charts.

Day by Day replaces your manual system for diary, business organiser, notepad, planner, reminder and so on.

It's suitable for both business and home applications, including numerous useful functions which serve every requirement.

It's suitable for both business and home applications, including numerous useful functions which serve every requirement.

SAVE £20

Among its many features are:

- ☆ Calender/diary/planner
- ☆ Categories such as bills, birthdays and letters
- ☆ Appointment sorting
- ☆ 'Urgent' notice board
- ☆ 'Overdue' notice board
- ☆ Advance notice of forthcoming events
- ☆ Updating of regular appointments
- ☆ Comprehensive search facility
- ☆ Automatic reminders
- ☆ At-a-glance week and month summaries
- ☆ Print option
- ☆ Grouping of related messages

Both of these powerful programs are excellent value on their own, but if you buy this exclusive combination package we'll knock £20 off the combined retail price.

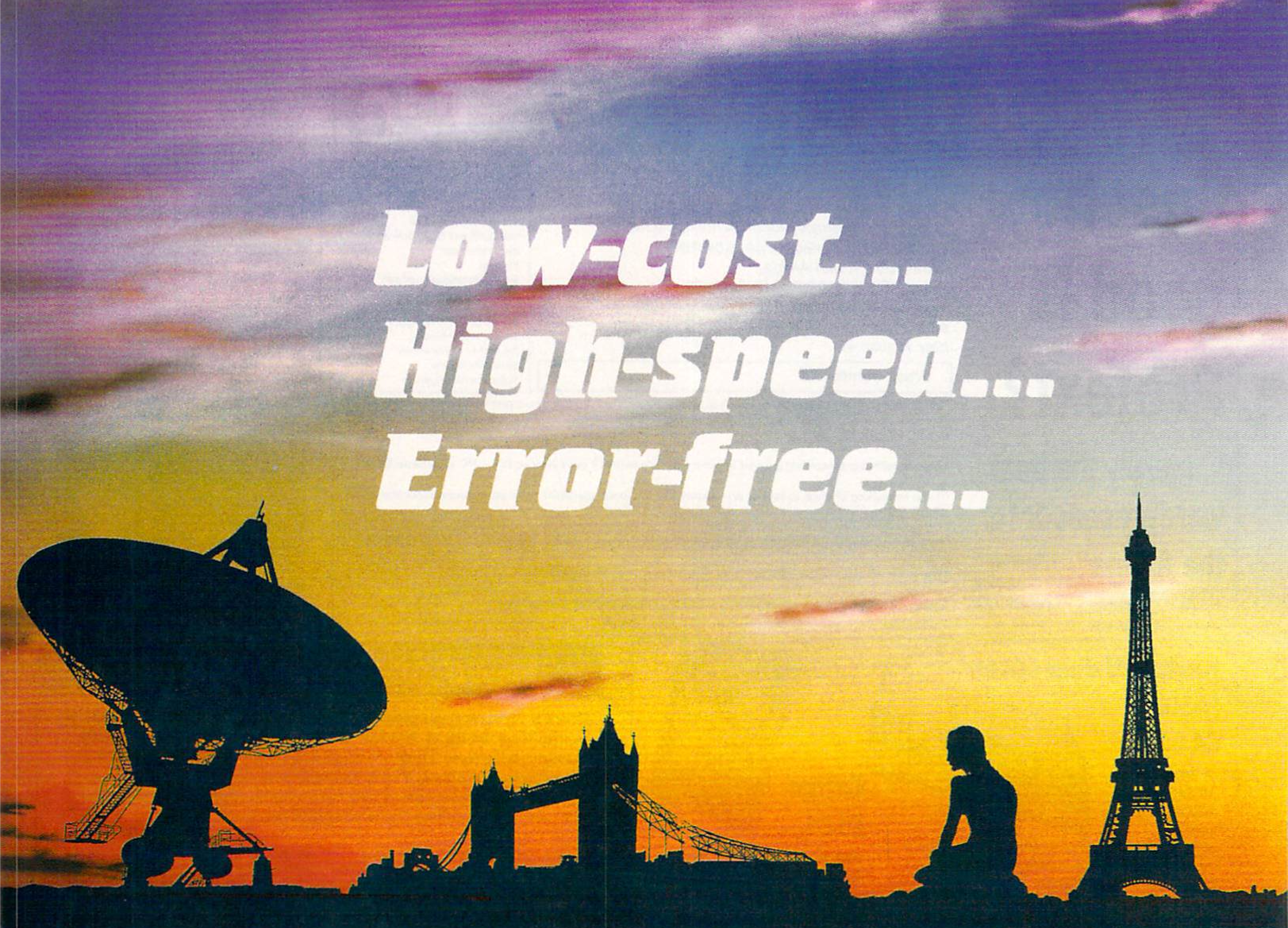
ArgAsm

Probably the fastest assembler ever for the Amiga!

Exclusive price for readers of Amiga Computing

ASSEMBLER	EDITOR
✔ Fast one-pass design	✔ Multi tasking
✔ Code limited only by memory	✔ Full multi-file capability
✔ Unlimited number of labels	✔ Unlimited split views of files
✔ Long label names	✔ Cut/paste between windows
✔ Unlimited macro nesting	✔ Insert/delete blocks etc.
✔ Unlimited include nesting	✔ Full configuration facilities
✔ Include binary data	✔ Save/restore environment
✔ Extra-helpful error messages	✔ Extremely fast text scrolling
✔ Instruction cycle timings	✔ Fast page update rates
✔ Processor flag display	✔ Assemble from any window
	✔ Works on Workbench screen

£54.95
RRP £59.95
SAVE £5!



This is what the EuroLink package offers . .

- ★ Fully automatic operation – you don't need any prior knowledge
- ★ A multi-speed modem – 2400, 1200, 300 and 1200/75 baud, offering MNP error correction
- ★ Easy-to-use free comms software
- ★ FREE registration to MicroLink*

... all for £254.95 VAT incl.

*valid until May 31

THE MODEM

The EuroLink modem is a robust and sophisticated device which turns data from your Amiga into signals which can be sent along a telephone line. It can handle speeds up to 2400 baud – about 40 words a second. Although it has many powerful features, it is simplicity itself to use when combined with its accompanying software. Built into the Hayes-compatible modem is MNP error correction – your guarantee of a corruption-free connection. Its wide range of other features include – auto dial and auto answer, auto redial, baud rate scanning, auto terminal baud rate sensing, 32-entry number store, internal loudspeaker, call progress monitor, bell tinkle supression, external plug mounted power supply unit and built-in 'watchdog' circuitry.

THE SOFTWARE

Accompanying the modem is one of the Amiga's most popular and easiest to use telecommunications packages, Access!, which simplifies the connection to MicroLink. Two mouse selections and the rest is automatic. After that you can move freely around MicroLink, capture text on disc and send pre-prepared documents – all with a minimum of keystrokes. It can also be used to dial other services in addition to MicroLink.

WHAT YOU CAN DO WITH MICROLINK

With MicroLink any Amiga can be turned into a complete communications centre. Without any additional expenditure it becomes a telex machine, a fax machine, an electronic mail terminal.

★ You can use it to send a letter for next-day delivery to any address in Britain, send a telegram to anywhere in the world, or even send flowers without moving from your Amiga.

★ It's also a retrieval tool that lets you search out and store data from the world's leading electronic libraries.

★ It gives instant access to the credit status of many thousands of companies all over the UK... and it lets you embark on exciting adventures – in real time! – with like-minded enthusiasts in faraway places.

★ It keeps you up to date with the latest news, sport and weather.



YES – the long-awaited breakthrough in data communications has finally arrived!

Now you can use your Amiga (plus phone) to talk to MicroLink and other computers anywhere in the UK – or all round the world* – using the very latest in modem technology.

Today there are hundreds of MicroLink telephone points throughout the British Isles. This means that the majority of subscribers access the service for the price of a local call.

APPROVED for connection to telecommunication systems specified in the instructions for use subject to the conditions set out in them

*The EuroLink modem and its accompanying software can also be used to access other information services such as Telecom Gold and CompuServe, as well as innumerable other databases and bulletin boards in the UK and overseas.

It's all you need to become part of a very friendly and helpful online community

ORDER FORM

Please send me a EuroLink modem with MNP error correction plus Amiga lead, power supply and free Comms software – all for the special offer price of £254.95 (incl. VAT)

☐ I am already a member of MicroLink ☐ I am not a member of MicroLink. Please send details

I wish to pay by:

☐ Cheque/Eurocheque enclosed made payable to EuroLink

☐ Access/Mastercard/Eurocard/Barclaycard/Visa/Connect

Expiry Date ____/____

No. ____ ____ ____ ____

Name ____________ Signed ____________

Address ____________

____

Post Code ____________

Daytime telephone number in case of queries ____________

Send to: EuroLink, Europa House, Adlington Park, Adlington, Macclesfield SK10 4NP

PHONE ORDERS: 0625 878888. FAX ORDERS: 0625 879966 AMC 5

Boost you micro's sound output with an Amiga Soundblaster



The essential peripheral for all games players and musicians

Take advantage of the Amiga superb sound capabilities by routing the output through the Soundblaster's high quality amplifier and speakers.

The amiplifier has been designed specifically for the Amiga and implements the latest microchip technology to produce an ear-shattering five watts output. Twin volume controls enable you to adjust the output and balance to suit.

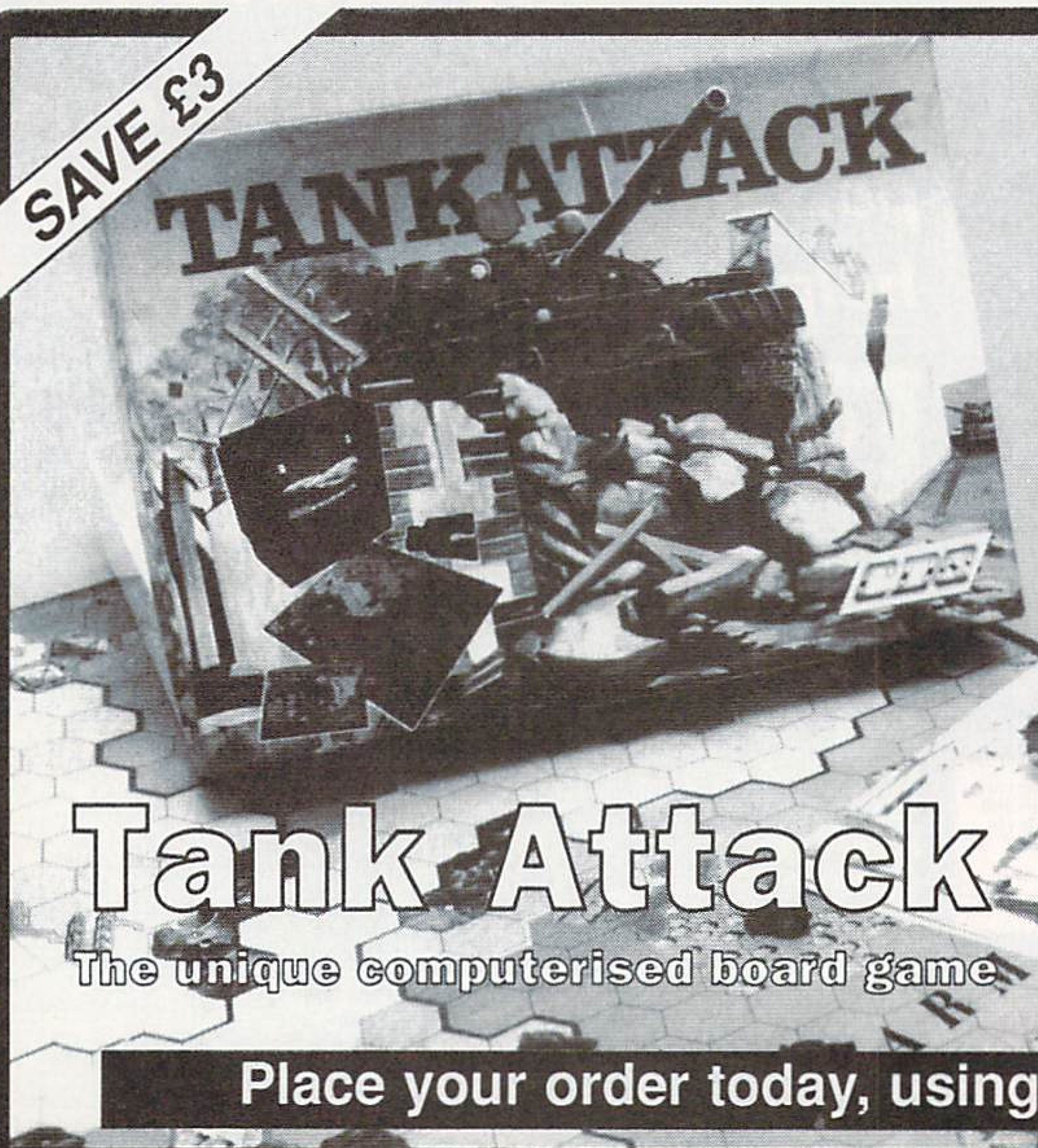
The quality 50 watt speakers consist of a 3in woofer for thumping bass output, a 2in mid-range unit for crisp music and effects and a tiny 1in tweeter which pumps out the highest frequencies the ear can hear.

The package comes complete with mains adaptor and full instructions. No soldering or opening of the Amiga case is required – simply plug in, boot up your favourite software and turn up the volume

ONLY £34.99

Order today,using the form on Page 113

SAVE £3



Tank Attack is a computerised board game for two, three or four players, where each one takes the role of a General commanding a country's Tank Corps of one or more armoured divisions.

Your objective is to capture the enemy headquarters, which will require the planned strategic deployment of your forces and regular fire duels between your own and enemy units.

Weather, morale, skill, judgement, planning foresight, careful management of rebuild and repair facilities and luck all play a part in deciding the result of each game.

Tank attack is one of those games you keep coming back to, and at the special offer price of only £19.95 is guaranteed to give you and your friends hours of action-packed excitement.

- Control a full division of tanks and armoured cars
- See all the fighting 'live' on your computer
- Superb board and fully detailed playing pieces
- Real time graphics
- Play as allies or enemies
- Suitable for all ages

Tank Attack

The unique computerised board game

RRP £22.95

OUR PRICE £19.95

Place your order today, using the form on Page 113

AMIGA COMPUTING READER OFFERS

Offers subject to availability

Valid to 31.5.90

Back issues

November 1989-April 1990 bundle	£15.00	9899	
†Add £3 Europe & Eire / £12 Overseas			
* November 1989	£3.10	9717	
* December 1989	£3.10	9718	
* January 1990	£3.10	9719	
February 1990	£2.10	9720	
March 1990	£2.10	9721	
April 1990	£2.10	9722	
Cover Discs August-January	£9.00	9881	

* Includes cover disc

Rombo Vidi-Chrome (NEW)

(see page 76) £119.95 9891

Protext Version 4

(see page 109) £79.95 9530

Casio Pocket TV400 colour TV

(see page 76) £94.95 9865 ✓
Plus post and packing £1.50

Hi Soft (NEW)

(see page 94) Basic Compiler £69.95 9896

Battery charger

(see page 24) £19.95 9861 ✓
Plus post and packing £1.50

World Snooker

(see page 93) £14.95 9900

Personal Organiser

£19.95 9901

Amiga DABhand Guide

(see pages 108-109)
A comprehensive guide to the Amiga's disc operating system (versions 1.2 and 1.3) £14.95 9866

Amiga cover discs

(see pages 108-109)

5 assorted discs	£7.50	9887	
25 assorted discs	£20.00	9888	

Mail Order offers

(see page 108/109)

Publishers Choice	£79.99	9867	
Mini-Gen	£98.85	9869	
Word Perfect 4.1 version	178.85	9870	
X-Cad	£89.85	9871	
Small Business Accs Xtra	£89.95	9873	
Mavis Beacon Typing	£24.99	9874	
Home Accounts/Day by Day	£34.90	9851	
ArgAsm	£54.95	9858	

Amiga Soundblaster (NEW)

(see page 112) £34.99 9890

Sim City

(see page 56) £24.99 9883

Drakkhen

(see page 56) £24.99 9884

Sim City and Drakkhen

(see page 56) £44.99 9885

Batman – The Movie Game

(see page 111) £14.95 9882

Tank Attack

(see page 112) £19.95 9848

Dust covers

£4.95 9507

Mouse mats

£4.95 9508

Binders

£5.95 9509

Disc boxes

£4.95 9860

Addition for postage: Europe & Eire add £3
Overseas add £5
Unless otherwise indicated

TOTAL

Send to: Database Direct, FREEPOST, Ellesmere Port, South Wirral L65 3EB

(No stamp needed if posted in UK)

Products are normally despatched within 48 hours of receipt but delivery of certain items could take up to 28 days

Order at any time of the day or night

Orders by phone: **051-357 1275**

Orders by Fax: **051-357 2813**

Orders by MicroLink: **MAG001**

Don't forget to give your name, address and credit card number

General Enquiries: **051-357 2961**

Payment: please indicate method (✓)

☐ Cheque/Eurocheque made payable to **Database Direct**

☐ Access/Mastercard/Eurocard/Barclaycard/Visa/Connect Expiry Date ___/___

No. ____

Name ____ Signed ____

Address ____

Post Code ____

Daytime telephone number in case of queries ____

AM5

TWO WAYS TO ENSURE YOU GET

AMIGA COMPUTING

EVERY MONTH

1. Complete and mail subscription form on Page 113.

2. Hand this form to your newsagent.

Please reserve me a copy of ***Amiga Computing*** magazine every month until further notice.

☐ I will collect

☐ I would like it delivered to my home

Name: ....

Address: ....

....

....

.... Postcode: ....

Note to newsagent: ***Amiga Computing*** should be obtainable from your local wholesaler. If not, contact Circulation Manager on 0895 444055

Why use six words when one is just as bad?

JARGON has always played a very important part in the computer world. It's used as much to confuse the beginner as to convey information rapidly. Making known your many years in the business is a matter of standing at the bar and speaking one piece of jargon for every two normal words.

It's a relatively easy task for someone with little knowledge of computing, but a good memory for jargon, to speak rather loudly about interfacing his MNP error-correcting flicker fixer to his interlaced copper flags, and be taken for someone who knows what he is talking about.

However, there are pitfalls that the would-be programming genius would do well to avoid when making his next social appearance. Always ready to assist, *Amiga Computing* can guide you through this jargon jungle, providing all the information you need to be confident of passing as a professional.

The first lesson is always to be totally up-to-date. The exciting and dynamic world of computing is *so* exciting and dynamic that new ideas and products are surfacing all the time.

Five years ago, proclaiming that Wimp environments were to be the next real thing would, at the very least, have earned you some funny looks. Even mice were still safely known as small squeaking rodents running around in wheels and eating cheese.

Using such words now will not gain you any street cred – they are already history, along with the transputer and Lisp. Instead, drop into the conversation words such as Unix, Open Structured Architecture and Interactive Video Realities.

Picking up jargon from books and magazines is very useful, but lacks the crucial information on pronunciation. The casual jargon user will be dropping a real clanger when he leans across the bar to a particularly pretty young hackette and says, "Have you seen version 3.4 of Tex?"

Those in the know will immediately spot his terrible mistake; although the text description language is written TeX, it is actually pronounced "teck". Picking up the correct pronunciation of something like SCSI is always tricky and best practised in the safety of a group of close friends.

The acronym, particularly the TLA (three letter acronym), is of paramount importance if jargon is to be employed properly. Be sure you know exactly in what context to use RAM, LAN, CPS and DMA.

And coming back to pronunciation again, always pay attention to those acronyms which are pronounced as words, like MIPS, and those as letters, like PSS.

Always feel free to be creative. Computing is a field where those with original ideas go far. If you ever find yourself sitting opposite some fat-headed show-off complaining that the MTTR of his DML is too long, the best way to shut him up is to make a comment to the effect that the PRS of the latest MaxiPlop IV has you completely UTW'ed.

Totally unable to acknowledge the existence of a gap in his extensive knowledge, he will nod wistfully and agree that MaxiPlops aren't what they used to be...



Sullivan Bluth's

DRAGON'S LAIR®: ESCAPE FROM SINGE'S CASTLE™





The Adventure continues...

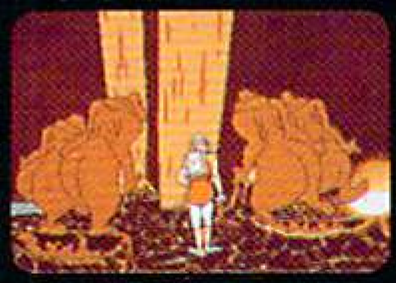
The Evil Shapeshifter has stolen Princess Daphne and to save her you will have to outwit the Evil One in totally new encounters never before seen in the original Dragon's Lair.® New scenarios and characters combine to make *Escape from Singe's Castle* the best sequel to the largest selling animated fantasy adventure of all time... Dragon's Lair.®

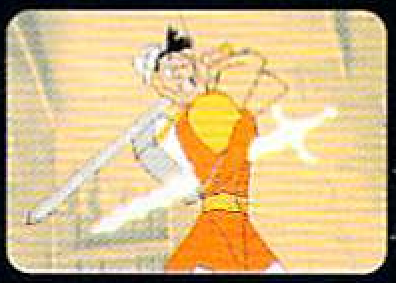
Muster all your skill and cunning to free Daphne from deep within the labyrinthian dungeons of Singe's Castle.

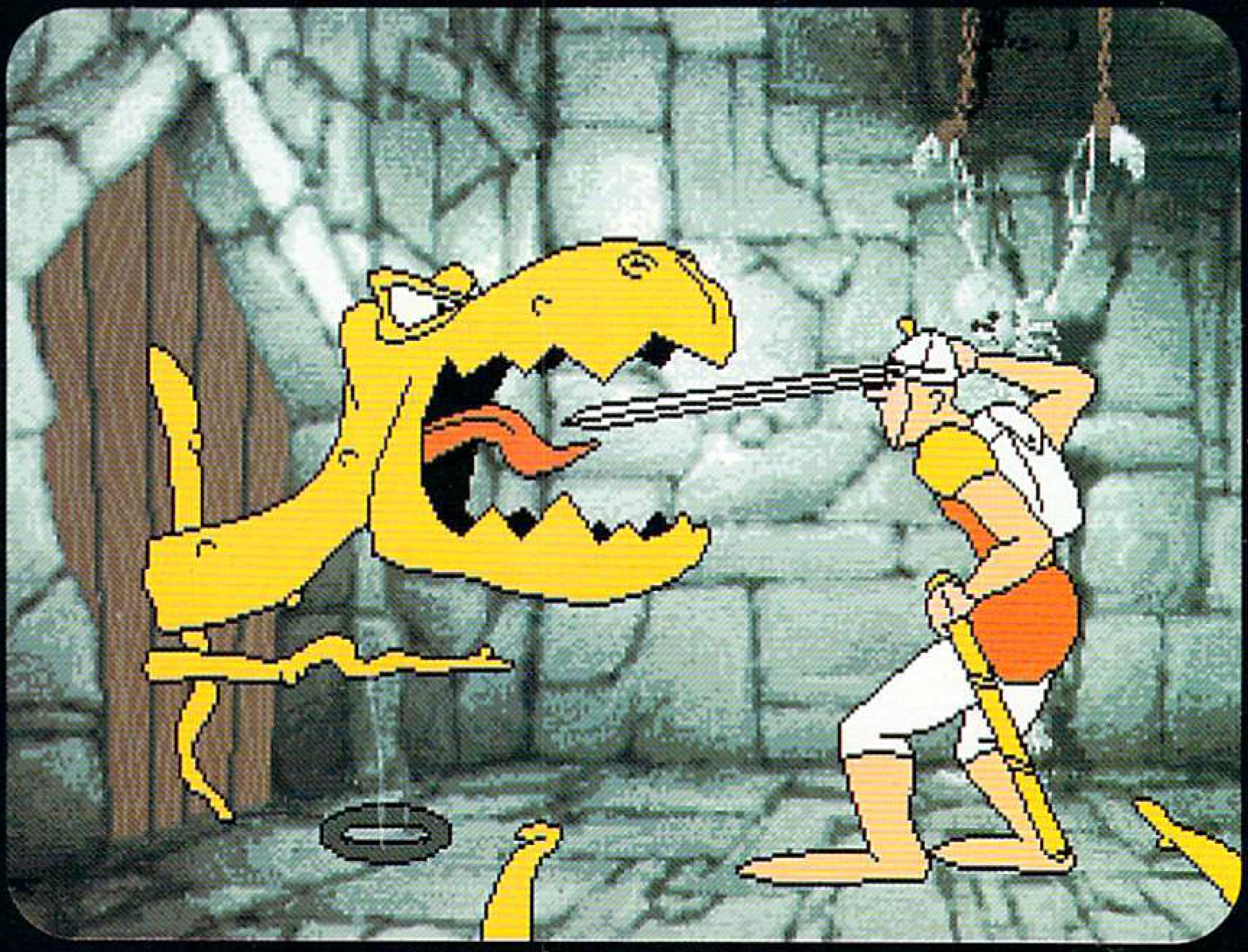
Lead on Brave Adventurer, your quest awaits!

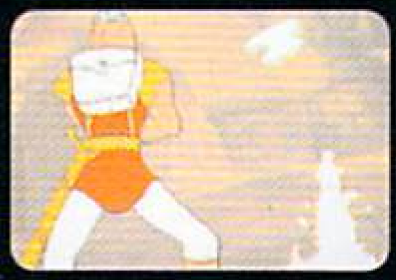














Amiga Screens Shown

ESCAPE FROM SINGE'S CASTLE™

- Installs on any hard drive for quick loading.
- Compatible with all 68000, 68010, and 68020 processors.
- Multitasks peacefully with any 1Mb Amiga.
- New Burstloader™ technology loads 10 times faster!
- Three selectable skill levels.
- Room flipping option increases difficulty.
- Directional arrows guide you during game play.
- Saves and restores up to 5 previously played games.
- Links with the original Dragon's Lair for the ultimate playing experience.
- Now requires only 512K RAM!
- Never the same game twice.







Currently for the Commodore Amiga
Coming soon to:
Atari ST and Apple Computers

Visionary, Ltd., a division of Media Technology Limited
15235 Shady Grove Road, Suite 100, Rockville, MD

Empire Software, Unit 4, Stannets Laindon North Trade Centre,
Basildon, Essex SS15 6DJ
Tel: 0268 541126